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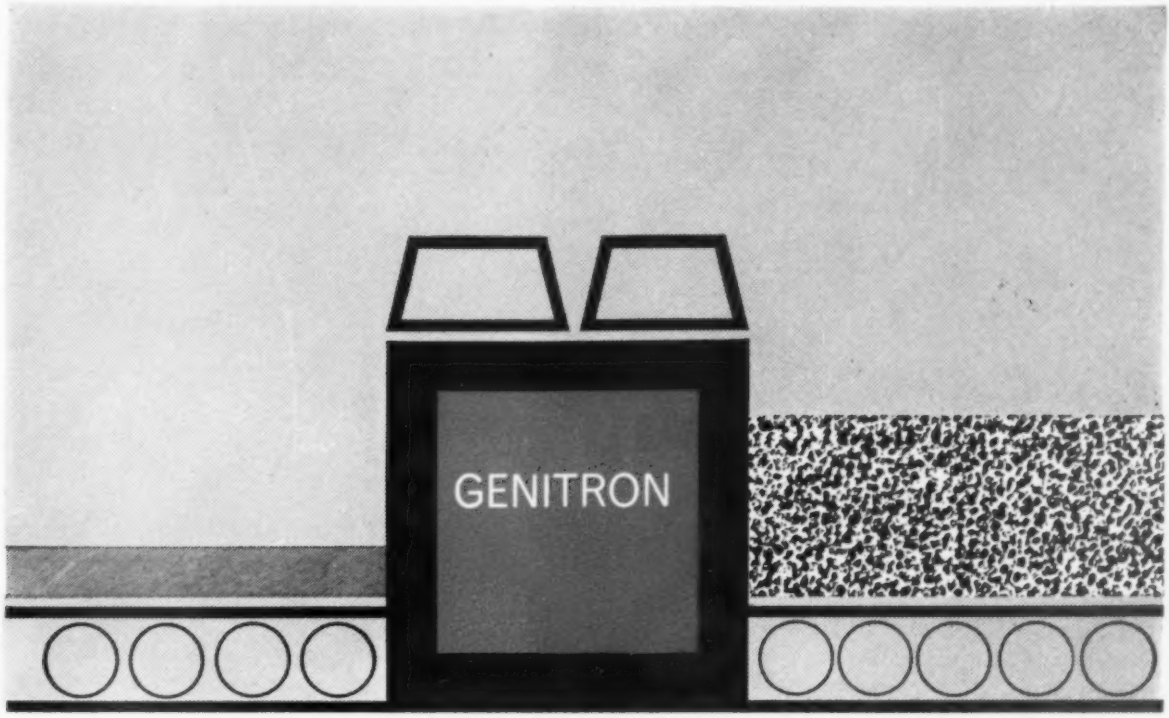

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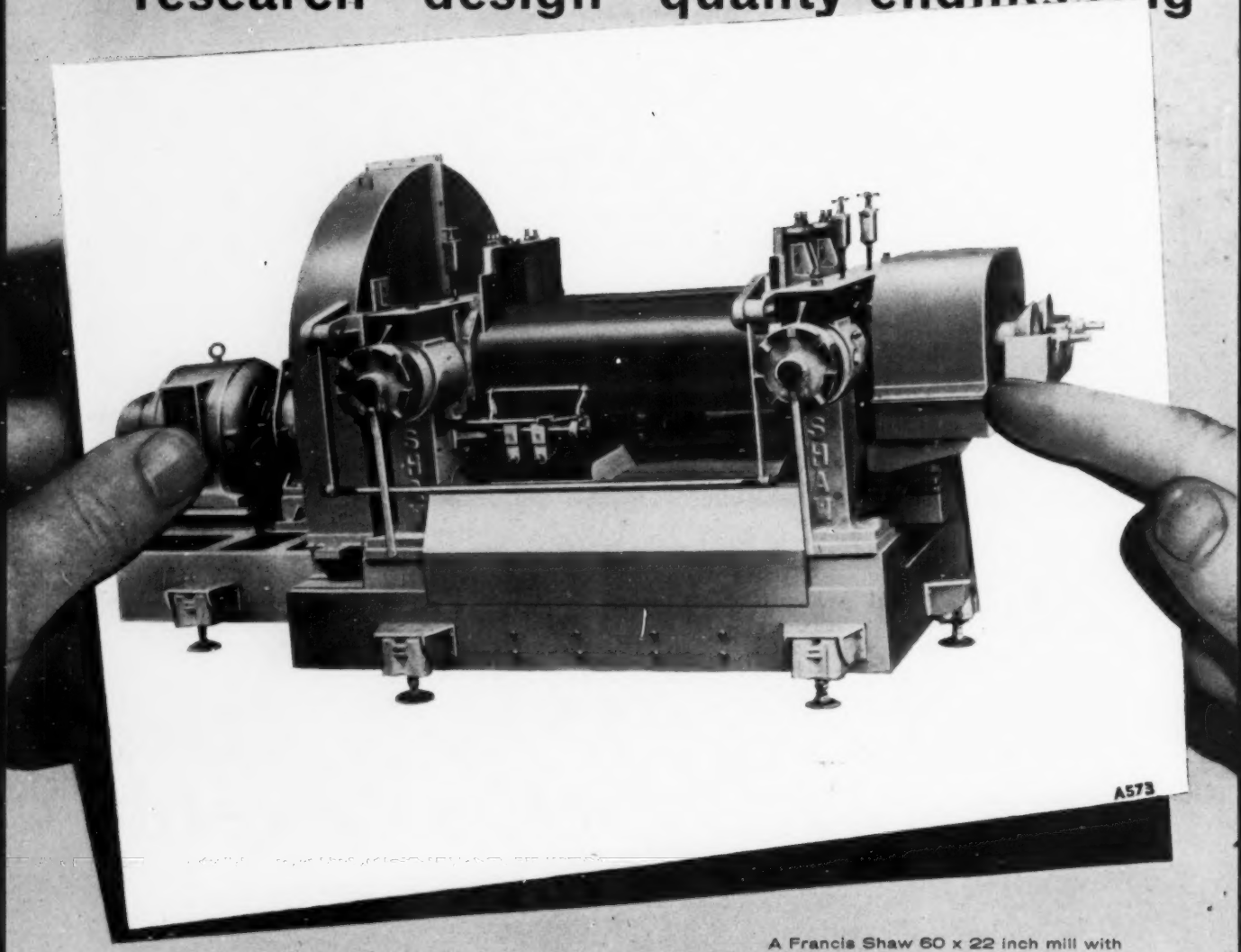

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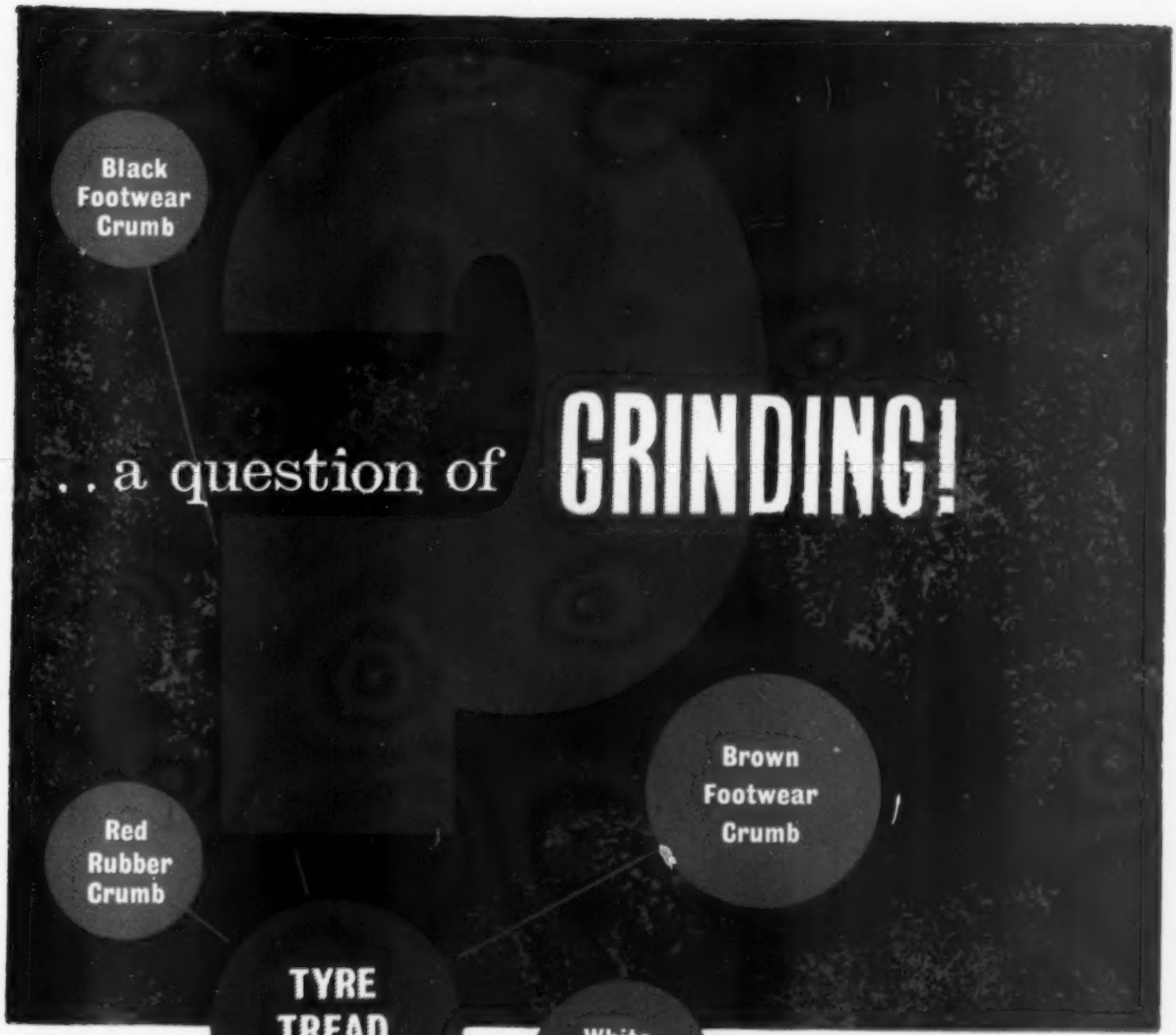
OVERSEAS AGENTS THROUGHOUT THE WORLD P4351



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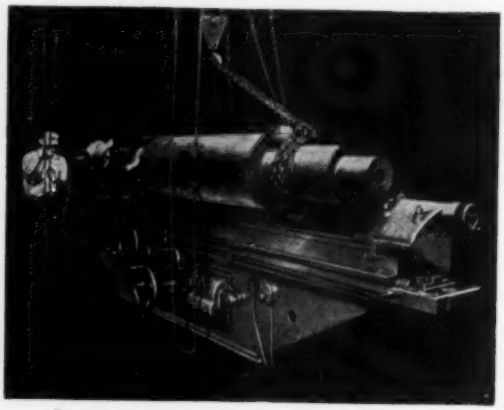

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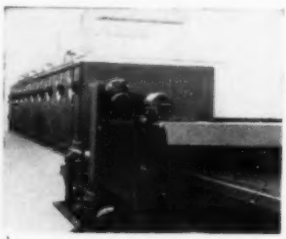

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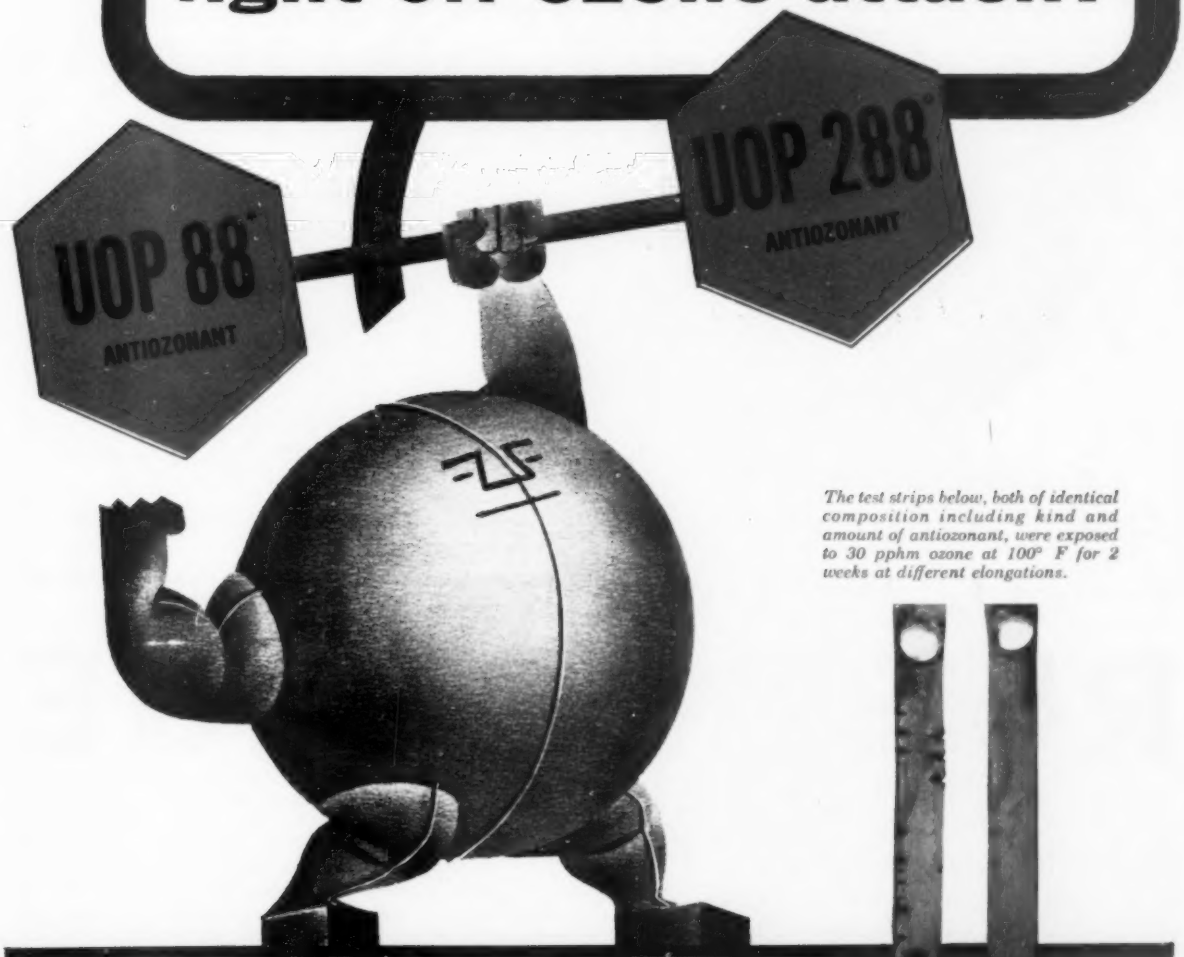

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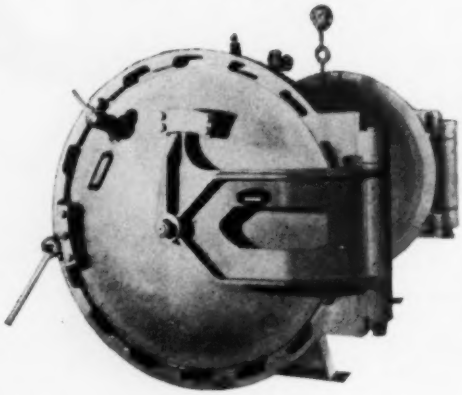

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Volume 140 *IN ITS 77th YEAR* **No. 25**

June 24 1961

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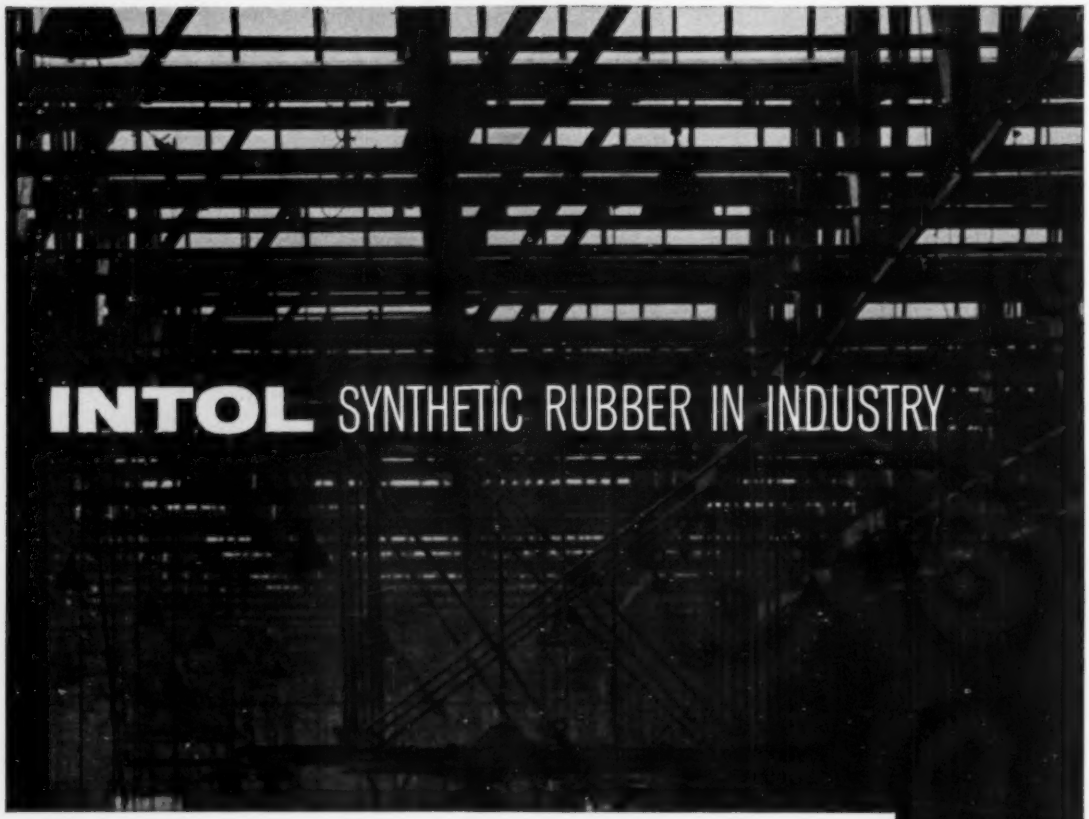

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NOTES of the WEEK

Breaking the Date

HOW often does the following business pattern occur? The product is a good one but it is up against more firmly entrenched, competitive products at the same quality level. By patient sales negotiation, and perhaps a bright idea from the technical service department, a substantial order is gained and the breakthrough made. The representatives, the product sales manager and the technical sales manager chalk the success up on their budgets and feel a glow of achievement — until it is suddenly discovered that the delivery date cannot be met. It is part of the contract, which is therefore lost, and the sales campaign is not merely back where it started — it is a good deal further back.

This is bad for the individual firm when it occurs on the home sales side; but it is also bad for the country when it occurs, as it does all too frequently, on export sales. Broken delivery dates were cited recently by Richard Soukup, a director of Richard Klinger Ltd., as one of the reasons why the UK was losing its share of Far Eastern markets. Mr Soukup, who had returned from a 40,000-mile tour of Australia and the Far East, said: 'Everywhere you go in the Far East you hear complaints about the poor delivery of British goods, and in Australia we are losing a tremendous amount of goodwill because, although Australians want to buy British goods, they despair of ever receiving them'.

'Certainly, we in this country have our problems — the recent dock strike, plus all the others, is one of them. How can British exporters hope to maintain good delivery times when their goods are held up for 10 days or more at the docks?'

Mr Soukup, who visited Japan, Hong Kong, the Philippines, Australia, Singapore, Thailand, India and Pakistan, said that the competition there was already fierce and that the Japanese, the Germans, the Italians and the Americans, were all fighting hard for a bigger share of the market. The Japanese exporters were doing particularly well, for their delivery times were good, their quality was good — on some products their quality was absolutely first-rate — and their prices were, of course, exceptional.

Delivery Approximations

AS far as Europe is concerned, the same criticism applies. In this country there is a tendency to regard the delivery date as 'something to work to' rather than something to be fulfilled. The date is an approximation: 'So long as they receive part of the order by that time, it will keep them happy'. The result is that a buyer tries to combat this by ordering well in advance of requirement, and by labelling everything as urgent. He mentally adds time on to the delivery date, and the supplier mentally takes it off. It is hardly surprising that European buyers find this sleight-of-hand technique puzzling and frustrating. By and large, continental industry works to a carefully planned, accurately timed schedule, and buyers will often purchase at a higher price from suppliers whom they are quite certain will deliver on time.

In the last year or so the President of the Board of Trade and others have made frequent reference to what exporters should do to build up their sales. Factors such as market research, and adapting the goods to meet local requirements, have been mentioned. But however well the product has been adapted to the market, and however good it is, it is no good at all if it is not there when it is wanted.

The Price of Disposal

THERE has been much speculation this week that the General Services Administration in USA, which controls the government-owned stockpile of natural rubber, will propose changes in its disposal programme in the near future. The current disposal formula has kept sales over the last six months down to a minimum, since it does not permit rubber to be sold at less than 30 cents a pound. A glance at the market price in the last few issues of *RPW* shows that it has edged uneasily downward, reflecting the uncertainty engendered by rumours about a possible move from GSA.

Many Singapore trade quarters believe that GSA will, sooner or later, sell rubber from the stockpile at a price as low as 25 cents a pound. But there is a considerable difference of opinion on what the new formula will be. A price of 25 cents a pound limited to a monthly amount of 3,000 tons — which is roughly the tonnage that needs to be sold to avoid loss through deterioration — would not have a serious effect on the market. But, since the current monthly US disposal sales are averaging 2,500 tons a month, it seems that, if there is a move, it will be a stronger one than this. In fact, some traders have been talking in terms of large tonnage releases below the 30 cents floor price.

NEWS *Briefs*

I.C.I. AT POZNAN — JAPAN/USSR SBR CONTRACT
US PHTHALIC PROJECT — EUROPLASTICA OPENS
SPANISH PETROCHEMICALS — GRACE IN EUROPE

●**Poland** — The British pavilion at the 30th Poznan International Fair aroused considerable interest. I.C.I. showed dyestuffs and pvc compounds and hope to increase sales of dyestuffs alone to £1m. per annum within the next two years. Large contracts are expected for textile machinery and plastics processing machines.

●**Spain** — Empresa Nacional Calvo Sotelo is expected to erect a petroleum refinery and petrochemical plant at Puertollano, where it is already established in the field of lubricants and liquid fuels.

●**Argentina** — Alfredo Federico Bracht has been elected president of Petroquimica Argentina, SA (PASA). Dr Wesley S. Coe has been appointed managing director. Dr Coe is former director of research and development for the Naugatuck Chemical Division of the United States Rubber Co. PASA, a recently-formed Argentine company, will build a $70m. petrochemical complex in Santa Fe Province to supply Argentina's needs in synthetic rubber, benzene and chemical intermediates. The five participating companies are the United States Rubber Co., the Continental Oil Co., the Cities Service Oil Co., the Fish International Corp. and the Witco Chemical Co.

●**South Africa** — The Goodyear Tire and Rubber Co. has dismissed 100 production workers from its Uitenhage, Port Elizabeth, factory. The company stated that production was to be curtailed, in general, because of the lower level of business and, in particular, because of the 'rather severe' import control on vehicles. Earlier, South African Motor Assemblers and Distributors (Samad) announced the dismissal of 167 workers from its Uitenhage factory.

●**Japan** — The Japan Synthetic Rubber Co. has signed a contract with the Soviet Union to export about 2,000 tons of synthetic rubber to that country. This is the first export deal in synthetic rubber between Japan and the Soviet Union, and the largest contract ever concluded by Japan to export SBR. The contract provides for shipments in August and September this year and is worth about £320,000. The company expects the Soviet Union to buy a considerable amount of Japanese synthetic on a long-term contract basis. At present it is exporting about 300 tons of synthetic rubber monthly to South-East Asian countries, including Formosa and Singapore.

●**France** — W. R. Grace and Co. is to establish a Paris office 'to facilitate technological contacts between European companies and Grace chemical divisions in USA'. The new office will not interfere with Grace chemical manufacturing plants in Europe, which operate under the control of the overseas chemical division. This division operates six plants in Europe.

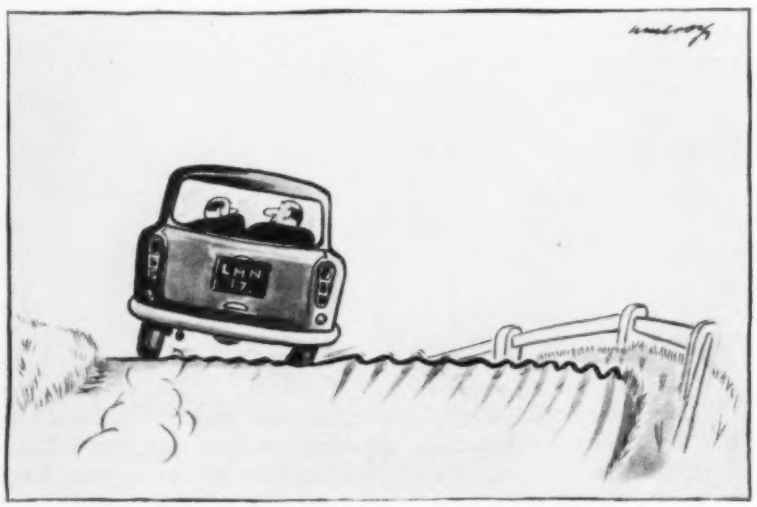
●**United States** — Union Carbide is to build a 50m. lb. a year phthalic anhydride plant at Institute, West Virginia. It is expected to go on stream late in 1962, and will use the naphthalene route. Main outlet for the product will be in plasticizers. The plant will be constructed by Badger Manufacturing.

●**Nigeria** — Most of the shares offered by the Dunlop Rubber Co. for its proposed tyre factory are expected to be bought by the Government of the Western Region of Nigeria. The Western Government is expected to take up 80% of the shares offered, the remaining 20% being left to the Federal Government, the Government of the Northern Region and private businessmen. Production of tyres is expected to start in late 1962 and latex from non-plantation rubber in the Western and Eastern regions will be used as the high quality latex produced at Dunlop's own plantations is uneconomical for tyre production.

●**Tanganyika** — The Tanganyika Government is reported to be studying the possibility of establishing a rubber industry in Tanganyika. The Kilombero valley has been mentioned as a possible site for development.

●**Belgium** — 84% of the exhibits at Europlastica 1961, which opened at Ghent on June 17, are from Common Market countries. A number of British and US companies are also taking part and a good deal of interest is being shown in the machinery exhibit of the Projectile and Engineering Co. which includes a long screw injection moulding machine of a new type.

●**Australia** — Although continuing to develop its product range in 1960, Laporte Chemicals (Australia) Pty. Ltd. suffered through 'the depressed economic conditions temporarily existing in Australia', states the chairman of Laporte Industries Ltd., P. D. O'Brien, in his annual report. He indicates that preliminary work on the new £A4m. titanium oxide plant at Bunbury, Western Australia, has already begun.



'I'll say this for these new tyres — they certainly hold the road!' — 542

Interplas Opens at Olympia

LORD HAILSHAM ON THE 'EXPLOSIVE RATE OF GROWTH' OF PLASTICS

MORE than 500 exhibitors were ready to throw open their stands when the Interplas international plastics exhibition, one of the biggest ever staged, was opened by Lord Hailsham, Minister for Science, on Wednesday (July 21).

One of the most fascinating general trends in technological development over the past 200 years, said Lord Hailsham, had been the development and substitution of synthetic for natural materials.

Whether these speculations were well founded or not, there was much to reflect upon in the past progress of the plastics industry, Lord Hailsham said. The output of the UK industry alone had been nearly 562,000 tons in 1960; and if the industry did no more than merely keep up its present rate of growth, it should be producing over 1.5m. tons by 1984.

more like 2m. tons. The Minister

In practice it should do more, and the true figure would probably be pointed out that, in the last ten years, thermosetting plastics in the UK had been increasing at the rate of 8.5% per year, as against a population increase of only 0.4% and an increase in growth domestic product of 4.7%. Thermoplastics had been growing at an annual rate of increase of 70%. He drew the conclusion that the industry should still be reckoned as in its early — if explosive stages of real growth.

Joint Swedish Effort at Interplas

SWEDEN is the first nation to make a combined national appearance at a UK plastics exhibition. Nine Swedish manufacturers, members of the Swedish Plastics Federation, are manning a large stand at the Interplas plastics exhibition.

The stand (BB507) forms part of the 'Sweden Comes to Britain' campaign continuing throughout this year until spring 1962.

At a Press conference, just before the exhibition opened, Nils Kallermann, chairman of the Swedish Plastics Federation, said that EFTA had been like a breath of fresh air to Swedish industry in the prospects it provided for increasing the sale of industrial products to the UK market.

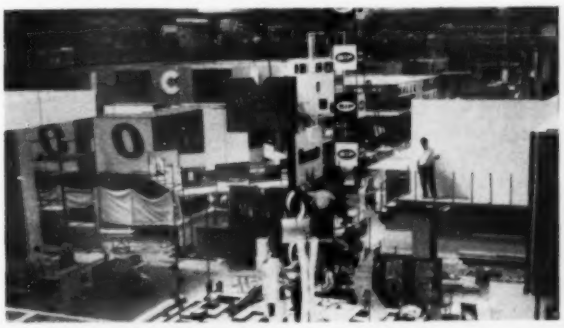
It was obviously against the background of this development, continued Mr Kallermann, that the general Swedish push into the UK market, under the name 'Sweden Comes to Britain 1961-62', had to be viewed. There had been a Swedish Furniture Exhibition in London and Swedish participation in The Ideal Home Exhibition. Now it was the turn of the Swedish plastics industry. 'From the very beginning', said Mr Kallermann, 'Swedish participation in Interplas 61 was an act of initiative on the part of the individual exhibitors — which is witness enough of the growth and of the range that this young branch of industry has already reached in our country, and of the energy and progressive spirit of its representatives. In terms of consumption of plastics Sweden holds third place in the world with an annual consumption per capita of 22.5lb., after USA with 30.8lb. and West Germany with 27.5lb.'

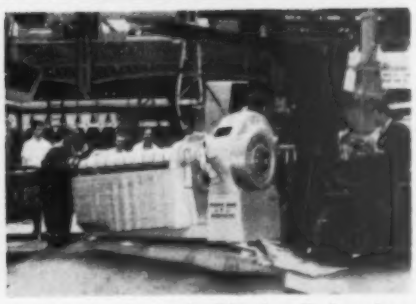
The nine Swedish firms taking part are:

Bofors-Tidaholmsverken AB, Tidaholm; Fosfatbolaget, Stockholm; Hagaplast AB, Anderstorp; Interplast AB, Bandhagen; N. Lundbergs Fabriks AB, Boras; Sunds Verkstader AB, Sundsbruk; Svenska Bindgarnsfabrikens AB, Malmo; Svenska Cellulosa AB, Holmsund; and AB Svenska Metallverken, Upplands Vasby.

Mr Kallermann and other Swedish officials at the conference are pictured below.

A Full Guide to
INTERPLAS 61
appeared in our June 17 issue — obtainable from
STAND BB537





An enormous amount of preparatory work was carried out at Interplas. These *RPW* pictures, taken on the day before the opening (Tuesday June 20), show some of the activity that has gone into making Interplas one of the biggest plastics exhibitions in the world. *(Top — left)* **Gallery view of a garden of floral shapes being 'grown' on the Monsanto stand.** *(Right)* **At a pre-exhibition press conference given by the Swedish Plastics Federation: Jan Erik Janson (secretary, SPF); P. A. Kollberg (commercial counsellor, Swedish Embassy) and Nils Kallermann (chairman, SPF).** *(Bottom — left to right)* **Putting a name to it on the Novadel stand; final adjustments to a GRP shower-bath, Glass Yarns and Deeside Fabrics display; swinging machinery into position on the Francis Shaw stand**

Castrol Moves Into Plastics

OFFER FOR MELWOOD AND TENSILE PRODUCTS

THE Castrol group is to enter the plastics field. An announcement from the group on Monday (June 19) said that 'Castrol Ltd. has entered into contracts to acquire 75% of the share capital of Melwood Thermoplastics Ltd., Harpenden, and the entire share capital of Tensile Products Ltd.'

Melwood extrudes thermoplastic components for the car, aircraft, building, furniture and other industries. The company's production facilities are being extended, and the Castrol tie-up will provide the necessary capital.

Tensile Products Ltd., besides producing fabrications on its own account, provides a finishing service for Melwood's customers.

Chemical Engineering Activities

A Castrol spokesman told *RPW* that this diversification into the plastics field fitted in with the group's activities in the chemical engineering and industrial chemicals field.

A. W. Meldrum will retain a financial interest in Melwood, and will continue as managing director of that company and of Tensile Products. A. G. T. Fryer and A. E. Chambers are to remain on the Melwood board.

Evode Move

The London sales department of the Evode group of companies moved last week to 450/452 Edgware Road, W.2.

Storage facilities at Greenford have been enlarged to cater for increasing demand for the group's products which include Evo-Stik Impact adhesives, Evomastic sealing compounds and chemical products for the building industries.

Greeff Markets Polybutadiene

R. W. Greeff, UK agent for Phillips Chemical Co., is now marketing development quantities of *cis* 1,4 polybutadiene in the UK.

Considerable interest is said to have been shown by a number of companies. The cif price, for 5,000lb. lots, is 32.57 US cents a lb. At the current rate of exchange, and adding duty, this makes the UK price (delivered) about 31.2d. a lb.

PI NEWS

Sir Lawrence Merriam for President

THE Council of the Plastics Institute has nominated Sir Lawrence Merriam, chairman of the British Xylonite group, as president for the 1961-62 session. The other Institute nominations are: chairman of the council: L. M. Reed (administrative manager (Laboratories) British Resin Products Ltd.) ; honorary general secretary: J. Taylor; honorary treasurer: A. W. Sherwood (group sales manager, Bakelite Ltd.).

The elections will take place after the annual general meeting on July 25.

Down the River

The President's reception and conversazione will be held on July 25. The programme includes a trip down the river by steamer from Charing Cross to Greenwich, and a visit to the National Maritime Museum. Further details can be obtained from the Institute.

Performance Testing

A conference on 'Testing for Performance' is being organized by the PI, and will be held from March 13 to 15 1962. The provisional programme is given below.

March 13. — 'Long-term Static Loading on Materials', by Prof. W. N. Findley (Brown University, USA). 'Long-term Static Loading on Pipe', by D. A. Gill (Water Research Association). 'Brittle Fracture-testing and Design', by P. I. Vincent (I.C.I. Ltd.). 'Impact Testing of Plastics', by R. A. Horsley (Shell Chemical Co. Ltd.).

March 14. — 'Electrical Insulation — Testing for High-voltage Application', by J. H. Mason (Associated Electrical Industries (Woolwich) Ltd. 'Testing and Evaluation of Plastics for Use as Electrical Insulation', by K. H. Stark (English Electric Co. Ltd.). 'Some Pitfalls in Dielectric Testing', by A. Reddish (I.C.I. Ltd.). 'Testing for Quality Control: Non-destructive Methods'. Contributions from Dr A. Nemet (Watson and Sons Ltd.), G. C. Karas (British Resin Products Ltd.) and B. Warburton (Distillers Co. Ltd.), and others.

March 15. — 'Standards and Testing in Industry', A. A. Tomkins (Joseph Lucas (Electrical) Ltd.). 'Preparation of National Standards', H. M. Glass (British Standards Institution).

This last day of the conference will also include an open forum, and the organizing committee is inviting any interested members to contribute to this.

Great interest was shown by Russian officials in the International Synthetic Rubber Co. Ltd.'s stand at the British Trade Fair in Moscow. As a result, negotiations are now taking place between the company and the trade organization Raznoimport. Pictured in Moscow are *(left to right)*: **T. V. Bashkatov (head of the department of synthetic rubber, state chemical committee of the Soviet Council of the USSR), H. J. Hornsby (general sales manager, ISR) and E. F. Manakhov (vice-president V/O Raznoimport)**

Malta Producing Soon

Malta Rubber Ltd., the company formed by the Dowty Group to manufacture seals in Valetta, is expected to start production this month.

A number of board appointments have been made.

F. Bastow is appointed chairman; he is also managing director of Dowty Seals Ltd., and will remain in the UK. E. Davies, who becomes director and general manager, will move to Malta.

Professor Felix Gremona, appointed a director, is a Maltese and already lives on the island. A. V. Galley has been appointed secretary.

POLYSAR LATEX 781

A Vinyl Pyridine Latex with an adhesive strength equal to the breaking strength of nylon cord

Polysar*Latex 781 will improve almost every kind of water based rubber-to-textile adhesive. For example, Polysar Latex 781 compounds will produce bonds between rubber and nylon tire cord that are as strong as the nylon cord itself. Manufacturers of V-belts and conveyor belts can also benefit from the superior adhesive properties of this versatile latex.

Polysar Latex 781 contains a unique stabilizer system which gives the latex good freeze-thaw stability and superior chemical stability in the presence of preformed resorcinol formaldehyde resins. Other features of this latex include good mechanical stability and low viscosity which contribute to easy and trouble-free pumping and storage.

**Trade Mark Reg'd.*

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tests prove adhesive power of Polysar Latex 781

TIRE CORDS	2 ply nylon	2 ply rayon
Denier	840	1100
Average undipped breaking strength (pounds)	26	25.5
Approximate cord diameter (in.)	0.021	0.024
Adhesion results (pounds pull, using dip recipe below)	22.5	25.0
Pounds Pull using Polysar Latex 781 alone	24.5	-

typical laboratory dip recipe

(using a rubber to resin ratio of 100/20)

INGREDIENT	Parts by Weight Dry	Wet
Polysar Latex 781 (42%)	80.0	190.5
Polysar Latex IV	20.0	47.6
Resorcinol	13.0	13.0
Formaldehyde (36.7%)	7.0	19.1
Sodium Hydroxide (10%)	0.8	8.0
Water—for resin solution	-	306.5
Water—for dilution	-	19.3
TOTALS . . .	**120.8**	**604.0**

There's a Polysar* rubber for every purpose . . . General Purpose Rubbers—Butadiene-Styrene Copolymers; Oil Resistant Rubbers—Butadiene-Acrylonitrile Copolymers; Special Purpose Rubbers—Butadiene-Styrene Copolymers; Butyl Rubbers—Isobutylene-Isoprene Copolymers; and Latices.

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GRP Wind Tunnel

AMBITIOUS PROJECT FOR HATFIELD TECHNICAL COLLEGE

A CLOSED-CIRCUIT open jet wind tunnel recently installed in Hatfield Technical College is thought to be the first fabricated from laminated plastics materials. It was made from a combination of epoxy resin, glass cloth and resin-impregnated glass mat.

Laying up a layer of ¼oz. glass cloth on a semi-circular wooden former

It was originally proposed that the new wind tunnel should have a conventional wooden or metal structure. The idea of using plastics materialized during discussions with one of the companies invited to submit quotations who had considerable experience in working with plastics materials particularly for tooling applications in the motor car and aircraft industries. No objections to the use of a glass reinforced plastics structure were foreseen, and so after the building of a scale model (1in. to 1ft.) work on the full scale tunnel was authorized.

Nearly 80ft. long, the tunnel was designed by the Aerodynamics staff of the College in collaboration with the Stanboro' Pattern Co. Diameters range from a minimum of 2ft. to a maximum of 4ft. It was fabricated in sections of various lengths from ¼oz. glass cloth, 2oz. glass mat and Epophen Epoxy resin manufactured by Leicester, Lovell and Co. Ltd. The particular grade of resin selected has a slight natural resilience to avoid crazing which could occur with a more rigid material when subjected to the stresses the wall of a wind-tunnel might have to withstand.

The method of fabrication was to lay up resin, glass cloth and resin-impregnated glass mat in successive layers on semi-circular wooden formers. The halves were subsequently bolted together and the circumferential joints sealed with ¼in. diameter rubber in a groove preformed in the flanged surface. The longitudinal joints were sealed with a plastics sealing strip. The tolerance specified on all dimensions was ± 0.031in.

A number of removable inspection hatches of 18in. square, each having a central 6in. square window of Perspex, were incorporated. The corner vanes were fabricated from aluminium sheet. The tunnel was bonded with chopped glass fibre and epoxy resin to an angle-iron frame fitted with anti-vibration rubber cushion feet. Power is provided by a 20hp squirrel cage motor driving through a Heenan and Froude dynamatic controlled slip coupling having a feed-back circuit to maintain fan rpm at a constant level. The fan unit was manufactured by Airscrew Co. and Jicwood Ltd.

The tunnel has not been in use long enough for a full evaluation of the advantages and disadvantages of the structure used over more conventional structures to be made. Some advantages, however, have already become apparent, mainly related to the actual construction of the tunnel, and details are given below.

Surface Finish

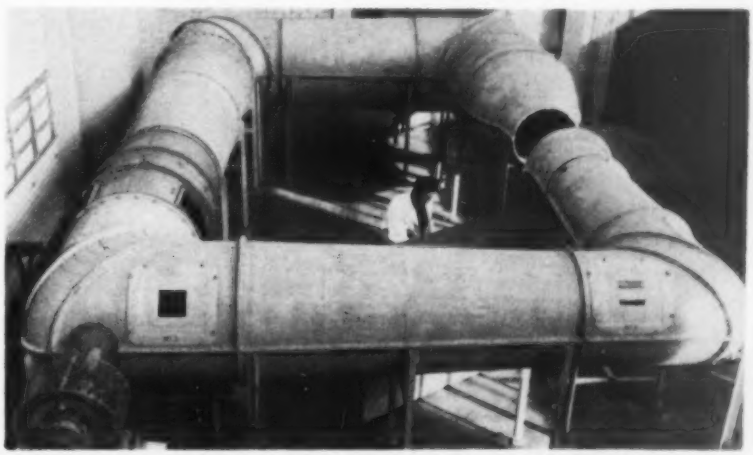
The better the surface finish the less are frictional losses in circuit. The excellent surface finish provided by the gel coats of epoxy resin could only be matched in, say, wood by time-consuming preparation and special finishing techniques.

Shape

A circular cross-section offers constructional and slight aerodynamic advantages. The formability of plastics materials enables a perfectly circular section to be made comparatively easily.

Stability

Tests have proved that the plastics materials selected are stable in varying atmospheric conditions and temperatures.



A general view of the completed wind tunnel recently installed at Hatfield Technical College, fabricated from epoxy glass laminates

Principles of Adhesion

CHOOSING THE ADHESIVE AND TYPE OF JOINT

PRACTICAL aspects of adhesion were dealt with in a recent lecture given to a branch of the Chemical Society by V. Vohralik, chief chemist, industrial adhesives division, Evode Ltd. Mr Vohralik referred to a paper read last year by Dr W. C. Wake, of the Rubber and Plastics Research Association, on the fundamental problems of adhesive-adherend systems. Dr Wake, he said, had shown how experiments could be devised to prove any particular theoretical aspect of adhesion and how experimentally obtained values often compared very favourably with the calculated work of adhesion.

Mr Vohralik, however, discussed the technological aspect of adhesive usage, and showed the importance of applying basic physical principles to practical problems in order to understand them fully. Such understanding, he said, was essential to the adhesive technologist when devising new test methods for evaluation of his products. It was also an essential tool of the adhesive user in order that he might choose the right adhesive and the right joint design to give minimum built-in stress concentration in any set of given conditions.

The factors determining the final or measured bond strength in any adhesive/adherend system, and their relation to the maximum possible or ideally obtainable bond strength, were discussed by Mr Vohralik with the aid of a pictorial diagram shown in Figure 1. This did not depict quantitatively the relation between the various factors described. The magnitude of A, D and all the intermediate factors were a purely arbitrary choice. The general aspect of the scheme applied, however, in terms of adhesion in shear, peel or direct tensile.

The maximum possible adhesion represented the ideally obtainable work of adhesion taking into account 'London' dispersion forces, the electron make-up of the adhesive and adherend (*i.e.* adhesion resulting from charge distribution and the formation of an electrical double layer contributing forces due to magnetic moment), and any chemical bonding resulting from chemical bond formation such as the ebonite method of rubber/metal bonding, or the use of polyisocyanates which contained at least two highly reactive -NCO groups.

Conditions to satisfy A could, he said, never be attained in practice because of the inability to produce the necessary condition of molecular nearness.

Loss L depended on the ability of the adhesive to wet the adherend and the quantitative measure of the effectiveness of wetting was the wetting angle which depended on the surface tensions of the adhesive, the adherend and the surrounding atmosphere.

Loss S, which further reduced the bond strength, was due to internal stress development resulting from dimensional changes along the adhesive/adherend interface. This could be simply due to volume changes in the adhesive layer resulting from solvent loss, cross-linking reaction or crystallization; or a result of differential expansion at the interface caused either by thermal changes, or absorption of water or any other liquid or vapour in which the joint was immersed.

Loss E, which reduced further the maximum obtainable adhesion to the measured bond strength, was self-explanatory, said Mr Vohralik. The most common causes contributing to this last factor were air traps, specks of foreign matter, such as metal or dust and excessive irregularities of the adherent surfaces.

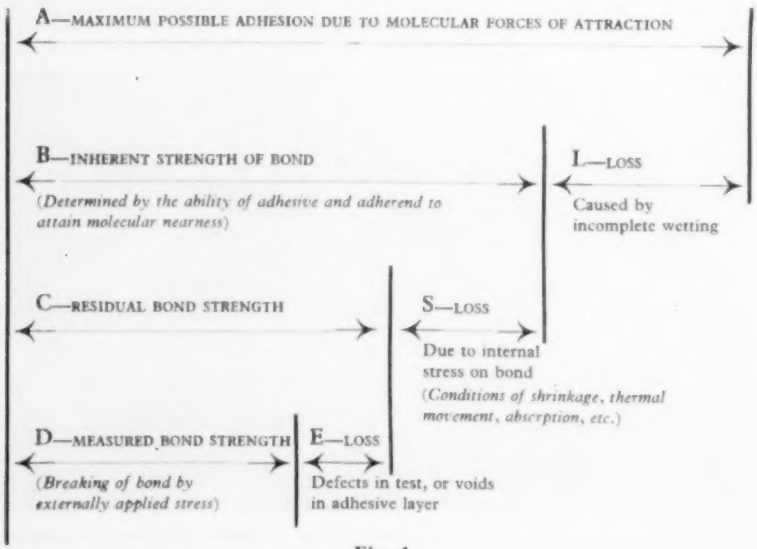

A—MAXIMUM POSSIBLE ADHESION DUE TO MOLECULAR FORCES OF ATTRACTION
B—INHERENT STRENGTH OF BOND
(Determined by the ability of adhesive and adherend to attain molecular nearness)
L—LOSS
Caused by incomplete wetting
C—RESIDUAL BOND STRENGTH
S—LOSS
Due to internal stress on bond
(Conditions of shrinkage, thermal movement, absorption, etc.)
D—MEASURED BOND STRENGTH
(Breaking of bond by externally applied stress)
E—LOSS
Defects in test, or voids in adhesive layer

Fig. 1

Importance of Viscosity

Having established the existence of a gap between the theoretically possible and the practically obtainable work of adhesion, he went on to discuss adhesive testing and evaluation. Before coming to the various adopted test procedures of strength measurement, he mentioned the importance of viscosity measurements. To most users of adhesives the viscosity of an adhesive represented only one thing — the ease of application; a viscous adhesive brought to mind one which was difficult to apply and rather messy, while a thin or fluid adhesive was the acme of perfection for it could be brushed, sprayed or applied by a roller coater without much difficulty. Adhesive technologists however did not entirely share this point of view, for very often a viscous, thixotropic adhesive was the cleanest of all to use. The main point was that changes in viscosity could affect the adhesive user in more than one way; a drop in viscosity might lead to incomplete wetting of a surface which greatly reduced the bonding efficiency, or it could increase the penetration into absorbent or porous materials leaving a discontinuous film on the surface and causing failure due to bond starvation.

It was, therefore, he said, clear that maintaining the correct viscosity was a very important point in adhesive usage, as this particular property, under certain circumstances, contributed to many of the loss factors

NEW BANBURY* DROP DOOR DELIVERS 3 BIG BENEFITS

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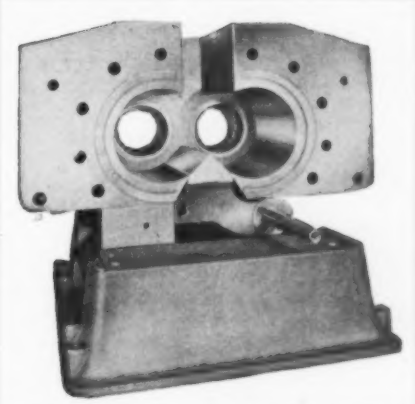
- *shorter cycles*
- *almost instantaneous discharge*

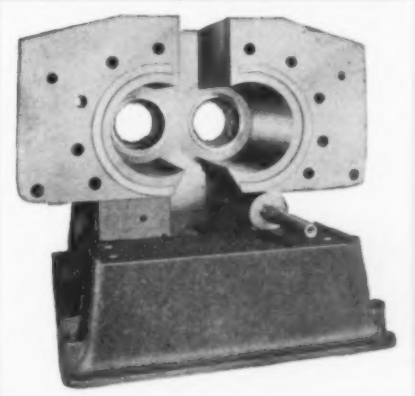
Here's a new development in Banbury mixer design: the hydraulically operated drop-door . . . now available as an optional feature on all new production-size machines. The drop-door design does away with a source of leakage and contamination which cannot be avoided in sliding-door design. Clearances which permit some leakage are required for sliding action which is not the case with the drop-door. The new door is hinged, and the surfaces of the door edge and the bottom of the mixing chamber are tapered so that a good line of contact is obtained. The door is leakproof throughout a full period of normal wear and there are no tailings left to contaminate a succeeding batch. The new door has been clocked as low as eight seconds for opening, discharge and closing—more than twice as fast as a sliding door. As a result, the overall mixing cycle is reduced. And, in short-cycle operation, discharge time is in better balance with actual mixing time.

Faster discharge, besides cutting cycle time, is particularly advantageous when formulas require almost instantaneous discharge after pre-determined temperature is reached. With some, a few seconds lag will permit the stock to set up in the mixing chamber.

* *Banbury is a registered trade mark in many countries throughout the world*

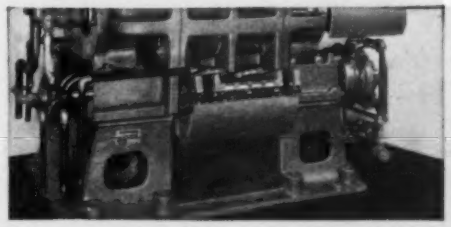


Chamber of Banbury with drop door in closed position



Drop door partially open

Angular view of drop door in open position



Size 11 D-High Pressure high horsepower uni-drive Banbury Mixer with drop type discharge door.

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which formed the gap between the ideal and the measured bond strength of any assembly.

He then went on to consider the strength tests employed in adhesive laboratories, their interpretation and their purpose and the deductions that could be made from such laboratory tests, bearing in mind service conditions. There were five basic strength tests used in evaluating adhesive compositions known as: 1, shear strength; 2, direct tensile strength; 3, peel strength; 4, cleavage strength; 5, impact strength (usually in shear but could also be applied to direct tensile or cleavage).

Complex forces were involved in all the basic types of adhesive strength testing; a simple tensile test produced shear in addition to tensional stresses, and shear and cleavage tests involved tensional, compressional and shear stresses; in addition the stress distribution, in each case, depended on the basic properties of the adherends and the adhesive under test.

In the peel test, where the angle of applied force might vary from zero to 180°, the reaction of the bond would depend on this applied angle, *i.e.* on the magnitude of the horizontal and vertical components of the applied force. Obviously, when the angle of applied force was zero, the case was of simple shear, while at 90°, where only the vertical component of the applied force exists, the bond stresses resembled those of the cleavage test. Another complicating factor in all the basic tests was the effect of the adhesive film thickness on the bond strength. (Figure 2 illustrates the dependence of shear and peel strength on the film thickness.)

In the case of shear and tensile strength, the thinner the adhesive film the higher the bond strength, while in

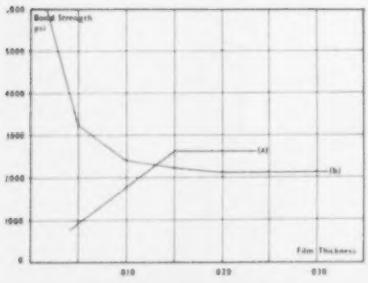


Fig. 2. Dependence of shear and peel strength on film thickness

the case of peel and cleavage, thicker films gave better results. In all the basic tests, the rate of applying the external load was of great importance and results could vary over a wide range, depending on the jaw separation of the given testing equipment. In any specification for adhesives the rate of separation must, therefore, be clearly specified.

Shear Strength

Mr Vohralik then analysed the four basic tests in more detail. Shear strength, he said, was a very important single property of any adhesive joint, especially when dealing with structural adhesives. It was usually determined on .5in. single lap joints which were bonded under optimum conditions. It was, therefore, not surprising that, for most adhesives, this standard shear value was completely artificial and bore little or no relation to shear strengths obtained in large area bonds and in most actual structures. Any comparison of shear and lap data must therefore be made with the understanding that the shear values were maximum values, and that in large area joints the values were reduced; a very high percentage for some adhesives while a relatively small amount for others. The elasticity of the adhesive came into play and the percentage loss was influenced to a great extent by this property — these losses being those represented by L and S in Fig. 1.

Direct Tensile Strength

Direct tensile strength was probably a more accurate measure of the work of adhesion than the lap shear strength. When comparing a number of adhesives, however, they would rate approximately in the same order as that which occurred in lap shear comparison. As in the case of shear tests, there were certain difficulties linked with test procedure, the main one being the dependence of the tensile value on the geometry of the joint. To illustrate this, the lecturer quoted details of tensile strengths in PSI on stainless steel adherend using a hot curing epoxy adhesive (Navord report 4273).

Geometry ..	1	2	3	4	5
Bonded area	1	1	.6	1	.2
Flange opening ..	1.55	1.14	1.14	1.14	—
PSI ..	3540	5205	5740	7870	8710

From these figures it was clear that not only the bonded area might influence the result, but the actual flange opening could play a considerable part in the result recorded. It was therefore necessary to specify very clearly exact dimensions of test pieces.

Peel Strength

This was a very searching practical test which was invariably specified for any flexible/flexible or flexible/rigid adherend system. Rigid adhesives such as epoxy and phenolic resins showed extremely poor peel strength, while elastomer/resin blends based on neoprene or acrylonitrile rubbers gave very high peel figures. The resistance to peel was not simply determined by the hardness or softness of the film. There was some indefinable property which determined peel behaviour for any given set of substrates, and this point was mentioned later when the lecturer discussed the effect of temperature change on peel figures. It was interesting to note, he said, that plasticizing an epoxy resin with an ester type plasticizer such as DOP/DNP did not have the slightest effect on the peel performance of the adhesive, yet it would improve beyond recognition the impact strength of the mix, and

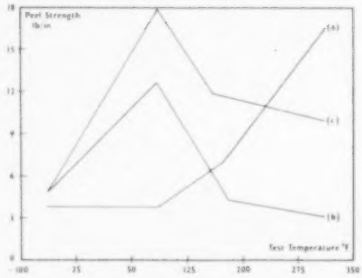


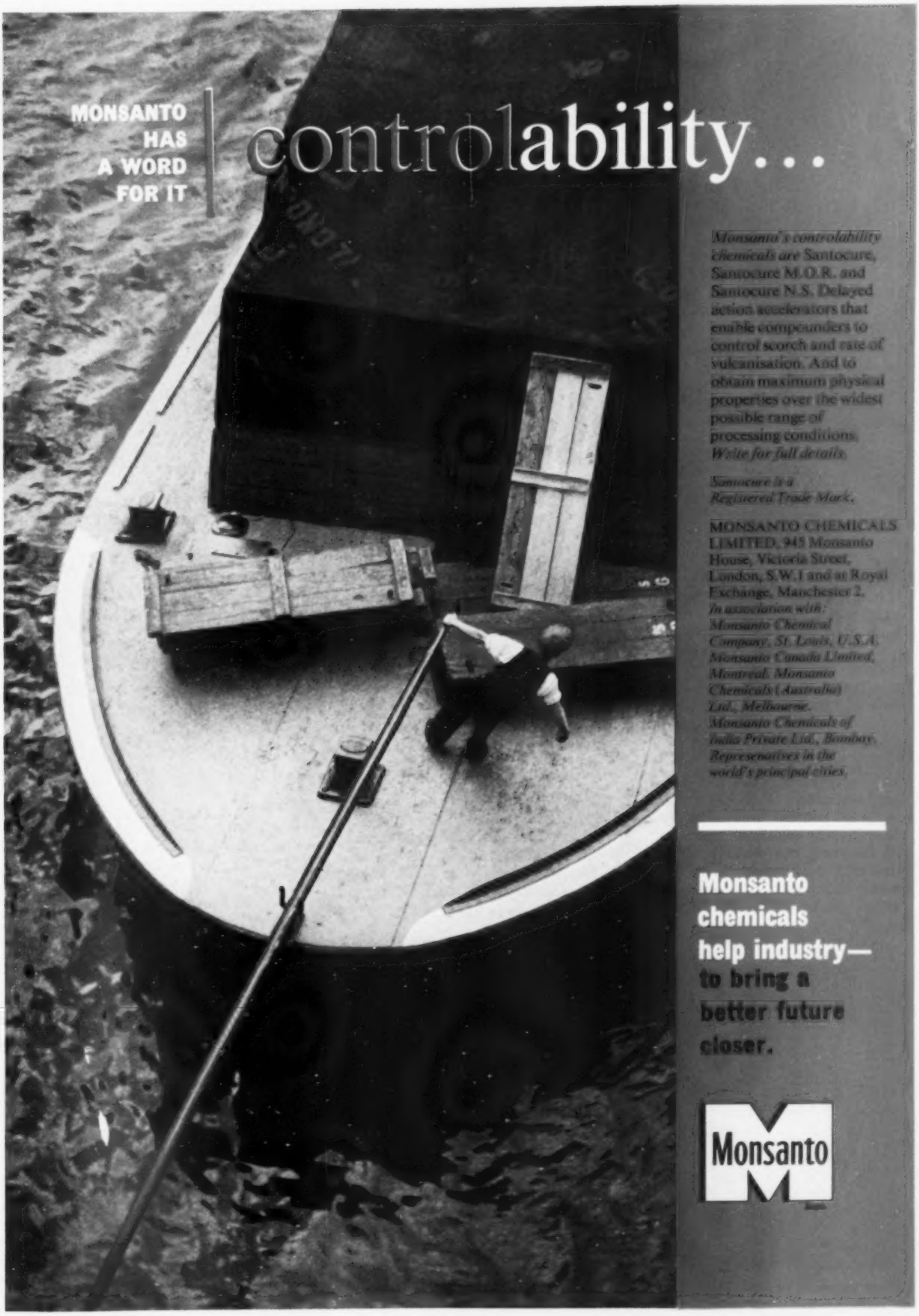
Fig. 3. Variation of peel strength of three specimens with temperature

therefore, the adhesive film must be capable of absorbing external stress; on the other hand, the use of a reinforcing fabric in the same epoxy resin film would increase five to six-fold the peel strength of the same system.

The influence of temperature on the peel strength was mentioned earlier, and Fig. 3 illustrates the behaviour of three testing systems when tested in peel. It was clear that temperature affected greatly the peel resistance of any adhesive system and it would appear that the resistance to peel was in fact closely linked with the thermal energy state of the adhesive film or possibly of the system as a whole.

Measurements had also been made on a neoprene compound containing various percentages of chlorinated rubber (Fig. 4). The effect of chlorinated rubber on an uncured neoprene polymer was similar to that of carbon black on a cured natural or synthetic rubber compound, *i.e.* it improved the tensile strength and altered the stress/strain curve giving much higher modulus and much lower

Continued on page 1018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Industrial and Decorative Laminates

FORMICA FILM SHOWS MANUFACTURING PROCESS

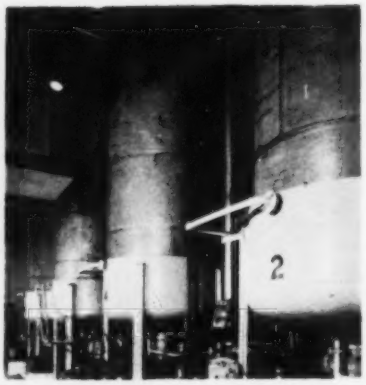
THE first film to be produced by the De La Rue film unit was shown for the first time just over two months ago and is available on free loan from the public relations department of Formica Ltd., or through Formica (Industrial) area officers.

This film, which is a 20-minute 16mm. colour feature with sound, is called 'Inside' and describes the manufacture, testing and end uses of Formica Industrial laminates. It is designed for trade and technical audiences in the plastics, electrical and allied industries and, in fact, should be of interest to anyone connected with the many branches of industry where use is made of laminated materials of this kind for structural, functional and decorative applications.

The Tynemouth factory, where the film was made, covers some 80,000 sq. ft. and is believed to be the largest laminating plant in Europe. It was built in 1947, primarily for the production of industrial laminates, but now produces both decorative and industrial materials.

Quality Control

The basic raw materials are resins, various types of paper and pigments, for production of the ever-widening range of patterns and colours, and a close quality check is carried out on all incoming raw materials to ensure that they conform with the manufacturing specifications before they are issued to the production department for use. This testing is done in the technical laboratories and it is here that the finished laminates are tested for various physical properties such as wear and heat resistance before despatch to the customer. Apart from the tests carried out at the beginning and end of the process, rigid quality control procedures are in operation at all stages of the manufacture of laminates to ensure consistency of the product.



From the storage tanks chemicals are piped to these resin stills at the beginning of the process

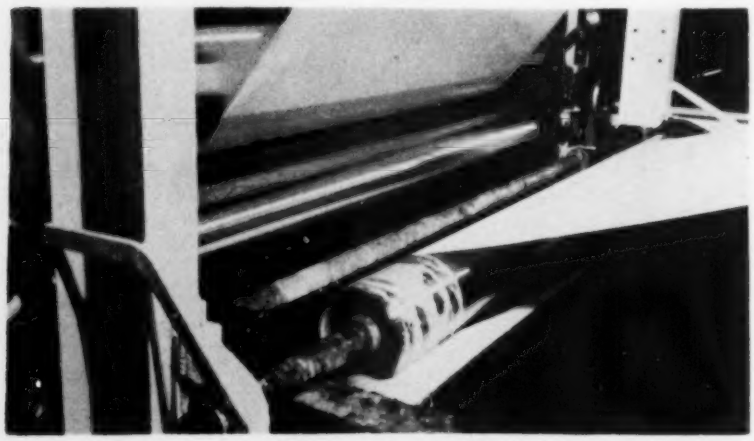
Colour Printing

Oddly, enough, one of the first processes in the production of decorative laminates is the printing of the designs and colours. This is done by a photogravure process, the specially prepared inks being applied to the background paper by etched cylinders, the daily increasing number of designs available making necessary many different etching cylinders and background paper colours. Much time is also spent on the preparation of the inks to ensure accurate colour matching from batch to batch.

Treating

The next stage in the process, for both the printed surface papers and the brown kraft papers that make up the core of the laminates, is the treating or impregnation stage. Here the papers, which are in rolls, are passed through baths of resin where impregnation takes place under closely controlled conditions. They are then passed through drying ovens attached to the treating machines and either re-reeled for future cutting, or progressively cut to the required lengths.

Since the papers can be impregnated with resin at speeds up to 120ft. per minute, very long ovens are needed to obtain the necessary degree of drying. The printed designs are protected in the finished laminate by a transparent melamine impregnated overlayer which imparts good wear and chemical resistance, and this material is impregnated, treated, dried and cut to length in a similar way.



Impregnation of the kraft paper with resin takes place under carefully controlled conditions in the treating machines

Visual Inspection

At this stage in the process a close visual inspection is carried out on both the printed sheets and on the transparent overlay sheets, for imperfections in the printed pattern and for dirt, before issue to the press assemblies. A continuous testing of all treated materials is also carried out by the process control section of the technical laboratories to ensure compliance with manufacturing specifications.

Once the core material, print and overlay have been cut into lengths the sheets are made up into packs containing the requisite number of core sheets to make up the required thickness and the design and overlay sheets ready for transporting to the presses. (A laminate $\frac{1}{16}$in. thick contains eight or nine core sheets.)

Press Assembly

When the core sheets overlay and print sheets have been made up into packs they are then placed between

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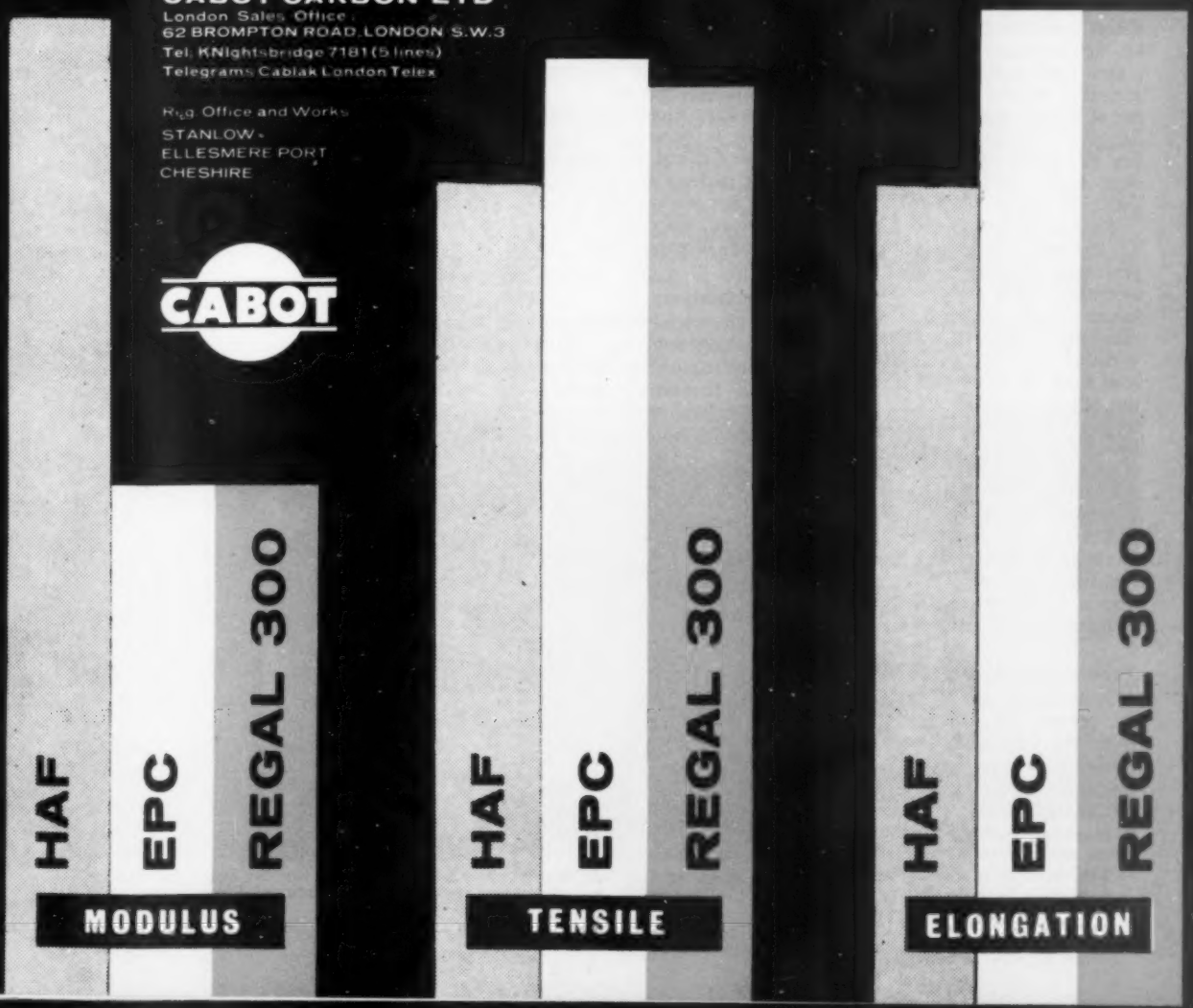
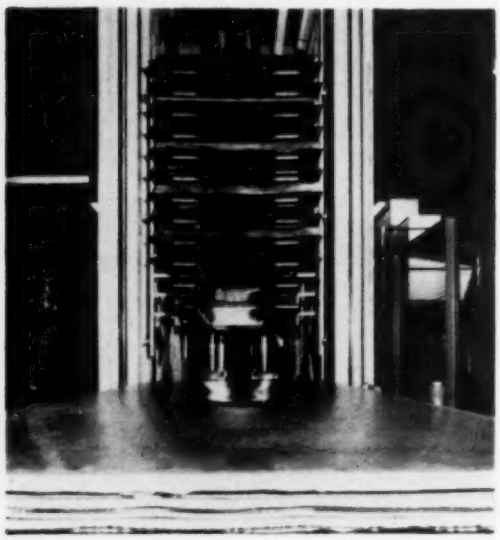


highly polished stainless steel plates and the pressing operation is carried out on this complete sandwich. The assembly is carried out by teams of six or eight operatives and a high degree of training and experience is required in the handling of both the sheets and the steel plates. The finish on the laminates is an image of the plates used and great care must be exercised on the handling and cleaning of these if the surface finish of the laminate is to be of a high standard. For the production of boards with a matt finish steel plates of a duller finish are sometimes used.



Built-up packs of impregnated paper going into the press

The curing presses are divided into 12 daylights so that 12 packs are processed at the same time. The assembled packs are placed on a press loader which feeds all 12 into the press simultaneously, at the same time withdrawing the previous finished load from the other side of the press, the whole operation taking no more than a few seconds. The presses are heated by high pressure hot water at a pressure of approximately one ton per sq. in. The boards go through a controlled heat cycle and are subjected to a predetermined pressure while in the press. The heat cycle is regulated by remote control from a central panel connected by thermocouple wires to the presses.

Another Inspection

Immediately on withdrawal from the presses the boards are subjected to another inspection so that faults not readily seen before pressing or introduced during the press curing cycle can be highlighted at the earliest possible moment and corrective action taken with the minimum of delay.

The boards are then nearing the end of their journey through the factory, but must still undergo finishing operations and yet another inspection.

The rough edges are first trimmed off by a power guillotine and the boards then pass to sanding machines where the reverse side of single sided laminates is roughened to provide a key for adhesive.

At this stage the glossy boards pass on to the final inspector, whilst the remainder go on to a dull rubbing machine where the highly-glossy surface is converted to a matt finish. The finished laminates are then ready for packing and despatch to all parts of this country and to many countries abroad, where they find a very wide range of applications.

Applications

Decorative laminates have, during the past few years, made a considerable impact on the domestic market for furnishing applications where their hard wearing properties, easily cleaned surfaces and attractive appearance make them ideal. In the kitchen particularly, where resistance to heat, water and staining from foodstuffs, coupled with the operating theatre cleanliness which can be achieved, laminated plastics have been very extensively used for all working surfaces, shelves, splashbacks and cupboards.

Attractive Design

The numerous attractive designs becoming available has greatly increased the use of these materials for wall coverings and partitions in homes, offices, restaurants and other public buildings.

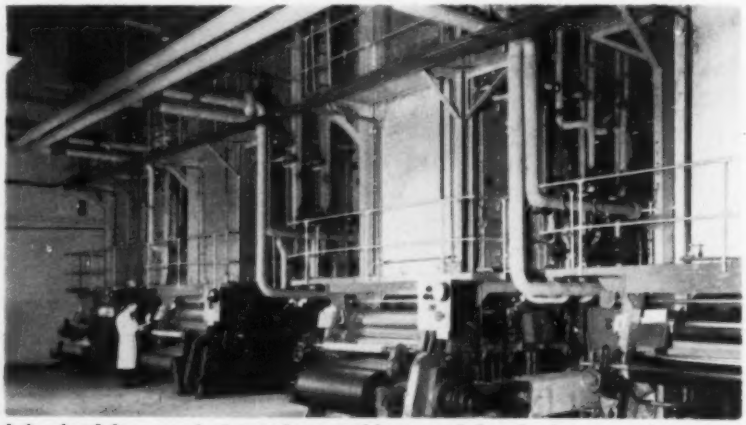
Furniture manufacturers are turning more and more to plastics laminates, in a wide range of attractive wood grain effects and other designs for the production of almost every kind of furniture.

Schools, hospitals, shops and stores, aircraft, railway carriages, ships, buses — almost every form of transport — all are making wide use of the properties of these materials to produce bright clean interiors which can stand up to rough treatment and extreme conditions of temperature and humidity very much better than many conventional materials.

Exterior Uses

More recently introduced are grades of laminates for exterior use which offer the builder and shop fitter appreciable benefits in terms of handling while setting them no new problems, since conventional methods of cutting, shaping and fixing may be used as for other exterior surfacing materials.

Used with discretion, by designers and architects who think carefully about the need for colour outside, exterior grade laminates can well play a big part in developing our towns into more attractive places.



A bank of four vertical treating machines used for the impregnation of the paper used in the production of most industrial laminates

PVC Punt Now Power-driven

A NEW development in rigid pvc boats is the fitting of a pvc fishing punt, brought out earlier this year, with a 3hp jet engine. Part of the punt's stern compartment is cut away to accommodate a Shipelle Saifjet engine. This increases the overall weight of the boat by about ½cwt. to approximately 2½cwt.

The model — to be called the 'Swampmaster' — can operate at full power in only 4in. of water, without risk of the engine being fouled by weeds. It is 14ft. 6in. long. In constructing it a framework of extruded sections in rigid pvc is cemented into shape and clothed in cut-to-size sheets of high impact pvc. Special buoyancy section of foamed material are incorporated in the fore and aft compartments.

The boat has been made for Imray and Wilson (Yachting) Ltd., by R. Giddins and Son, and retails at £185 (including engine). British Geon Ltd.'s Geon pvc has been used.

Another Hairlok Factory

The Hairlok Co. Ltd. of Bedford, manufacturers of latex foam and rubberized hair, has acquired a 16,000 sq. ft. factory, which will provide sales and purchasing office accommodation, warehousing facilities and an area for the assembly of packs.

The company's main factory in Bedford will continue to be the chief manufacturing unit. Movement of sales and administrative offices to the new factory will provide much needed space for work associated with Hairlok's packaging service.

The company expects that the new building will enable them to maintain a first-rate delivery service to furniture manufacturers, upholsterers, packers and other users of their materials.

Hypalon for IBM

An ultra-modern IBM computer plant at Corbeil-Essonnes, Paris, has just been completed.

Most of the exterior walls have been covered with a Hypalon-based paint.

BPF Form New Group

A new group of the British Plastics Federation, to be called the Wood Chipboard and Particle Board Group, has been formed, and has been joined by all the leading members of the British Wood Chipboard Manufacturers' Association, which has now been dissolved.

The chairman of the new group is F. C. Lyman, who has been chairman of the Association for the past three years, and the group technical committee chairman is C. M. Bussy.

Members of the Association who have become members of the British Plastics Federation and will be members of the new group are: Airscrew Co. and Jicwood Ltd., Bartrev Board Co. Ltd., British Plimber Ltd., F. Hills and Sons Ltd., and Ulster Chipboard Co. Ltd. Another member of the group is Michael Nairn and Co. Ltd., which has been a member of the BPF for some years.

PVC Silk

A 'brush silk' pvc is to be added to Paniquil Ltd.'s range of padded and quilted pvc panelling. There will be three colours: hydrangea blue, rose pink and zephyr white.

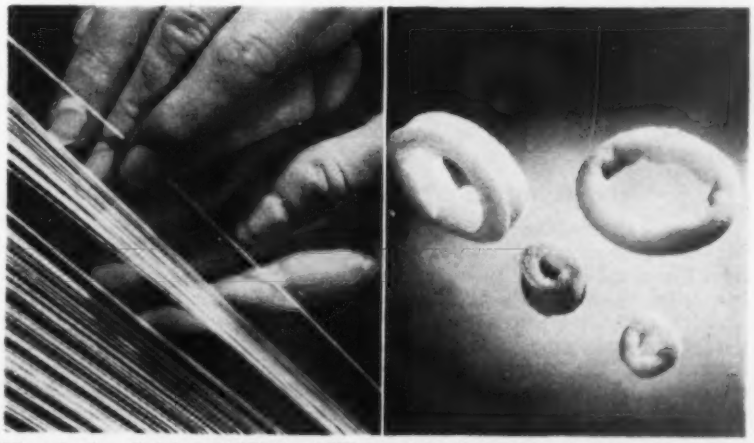
SBR in Footwear

THE International Synthetic Rubber Co. Ltd., of Hythe, Southampton, has carried out work on improved formulations for various types of footwear which can be made containing SBR. The information is published in a new edition of the company's booklet 'Intol in Footwear'.

The booklet includes the latest figures issued on sales of rubber footwear products in the UK and makes mention of more recent trends in the manufacture of various types of shoe solings.

A special foreword in eight languages — French, German, Spanish, Portuguese, Swedish, Arabic, Russian and Chinese — is inserted in all copies dispatched overseas.

ISR exports to 32 overseas countries and the export sales in 1960 were over 17,000 tons.



The plastics division of Richard Klinger Ltd. is now producing ptfe monofilament which can be knitted up into a mesh for various applications (*RPW* **June 17, 902**). **Left: 0.018in. monofilament; right: made-up filter elements of 0.018in. and 0.007in. monofilament**

VIEWS and REVIEWS

WHILE politicians in this country are still shuffling uncertainly on the edge of the European Common Market, the Continent itself is beginning to look further afield. An article by Jean Delorme in the May 1961 issue of *l'Officiel des Matières Plastiques* (a special number dealing with the eighth Oyonnax international plastics exhibition) considers 'Common Markets and Economic Development'.

South American Markets

Beginning with the idea of a union of the Common Markets of Europe with the countries of Latin America — and the possibility of a Common Market being formed there — the obvious difficulties are examined, but M. Delorme has fixed his sights so far ahead, even on an ultimate Common Market of the World, that he sees this as a likely first step.

'To us', he says, 'it has seemed to be of interest to make known to our readers the actual condition of the plastics industry in Latin America . . . and to give them a view of the standard of life in those countries'.

South America is no longer 'a vast region of desert inhabited by savages with feathered headdresses, but is becoming more and more a continent of ultra-modern cities which will make pale with envy many of the Mayors of great European cities embedded in their past with all that that implies in cultural riches, but also in urban complications, ill health, and discomfort'. He develops this in a style of rhetorical irony that has to be read in the original to be appreciated.

The development possibilities in the plastics industry in South America are 'prodigious'. Of course, US influence is preponderant, especially in the manufacture of the basic plastics materials, if only because local resources in technology and finance have so far been insufficient. But European countries are fairly well represented, too. Before advantage can be taken of the many openings, particularly in the sale of machinery, the first requirement is to have on the spot an intelligent salesman or agent who knows the country and the product.

The author then comes to the main part of his survey in which he discusses some of the practical problems and opportunities in the individual countries: Argentine, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela. This is an intelligent, stimulating and practical report of interest and value to actual or potential exporters in all European countries.

Aspects of GRP

There are several articles on reinforced plastics in the May 1961 issue of *l'Officiel des Matières Plastiques*. A brief illustrated description of the making of a moulded bas relief in coloured GRP, is followed by an article describing building panels having an inner core of expanded pvc and facings of GRP.

Because of the extremely rapid commercial development of GRP in France there has been a shortage of capable workpeople and technologists which has been met, in one way, by the establishment of training courses. These are described by Prof. G. Kesler of the National Institute for Professional Training.

The courses are of two main types: for workpeople and for technologists. The course for workpeople lasts about six months, at 44 hours per week, of which 36 hours are devoted to practical work. The course for technicians lasts for nine months, 40% of the time being for practical work and the remainder being divided between testing materials, design, technology, mathematics and mechanics, and various theoretical studies. There are conferences, visits, and a final examination.

The scheme began in 1955 and has already been very successful.

Peroxide Catalysts

A survey in the same issue of *l'Officiel des Matières Plastiques*, of the chemistry and applications of organic peroxides as polymerization catalysts, is a valuable study of a specialized but fundamental subject. I am sure that students will tear it out and keep it for reference. Though prepared from a commercial point of view by the Research and Development Service of Elektrochemische Werke München, it is an excellent piece of educational writing on the chemistry of polymerization.

The article sets out to sketch in what manner and to what extent these peroxides can be employed in preparing plastics materials, giving special attention to each of the peroxides in turn. Having outlined the two types of chain polymerization — by ions and by free radicals — it describes polymerization in solid, in solution, in emulsion, and in suspension, and the use of inorganic catalysts and then the redox systems, well known in making SBR.

For purposes of classification, the organic peroxides can be regarded as being derived from hydrogen peroxide. From this it follows that two main derivatives are possible, according to whether one or two of the hydrogen atoms is replaced by an organic radical, giving either the hydroperoxide or the peroxide. Cyclic peroxides, such as dimeric and trimeric ring structures are also possible, and there are mixed peroxides or peresters.

Peroxides can be formed by auto-oxidation of hydrocarbons or by the reaction of hydrogen peroxide or alkali peroxide with a range of other compounds. The article describes these reactions and then deals with the crux of the matter, chemically, the products of decomposition of organic peroxides, the most important of which are the free radicals and the free energy.

These considerations lead on to the roles of activators and inhibitors, and so to the polymerization processes which produce pvc, polystyrene, and the acrylic polymers.

Next is described the part played by the peroxides in the polymerization of the unsaturated polyesters and particularly when they are reinforced with glass fibres. These matters are discussed in some detail, including curing in the cold with hydroperoxides and accelerators such as cobalt naphthenate, and with acyl peroxides and tertiary amine accelerators.

French Machinery

Anyone who wants to get a good view of the available French machinery and equipment for plastics could not do better than consult a 90-page section in this May 1961 issue of *l'Officiel des Matières Plastiques*. It covers: single and double extruders, granulators, presses, injection, blowing, and compression moulders, printing by

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

offset, silk-screen, and hot impressing, grinders, cutters, and sieves, automatic weighing and measuring devices, mills and mixers, and so on.

Mixing of Solids

I did not see a paper by J. J. Fischer called 'Solid-Solid Blending' which appeared in the August 1960 number of *Chemical Engineering*, but I would like to mention it as it is given in translation in *Kunststoff-Rundschau*, May 1961.

The ideal mixer of solids must have the following characteristics:

1. Efficient mixing in the shortest time.
2. Economical mixing; a maximum of work with a minimum of power consumed.
3. Easy cleaning. Inner surfaces should be free from deep or complicated shaping.
4. Complete emptying, without leaving a residue in the bottom or on the walls.
5. Dustless.
6. Ease of mechanical repair, adjustment, and changes.
7. Small energy consumption.
8. Low cost of installation.

All these points are discussed in the paper, which has a long introduction on the elementary but basic theory of effecting adequate solid-solid mixing. The influence on mixing of the particle shape and size, and of the superficial area in relation to powder flow is explained, and this is followed by a consideration of the influence of surface electrical charges on ease and degree of separation and dispersion.

A large section of the paper is devoted to an exposition of the important conception of the 'critical proportion' or, simply, the degree of mixing required for the job in hand. To grind finer or to mix more thoroughly involves the expenditure of rapidly increasing energy. There comes a point at which this is uneconomical and, on the other hand, it is sometimes essential that a key constituent must be very finely dispersed. Several factors are involved in calculating the best mixing conditions: time, efficiency, proportions of ingredients.

The paper ends with a brief discussion (which could have been extended with advantage or made the subject of a second paper) of several kinds of mixing machines, such as the drum or barrel mixer, double-cone mixer, trough mixer, and edge-runner mill, each being considered largely from the standpoint of the ideal requirements set out above.

Leather from the Other End

We are by now accustomed to the idea that plastics are materials in their own right and not 'ersatz' substitutes for older materials like wood, metal, and leather. This is not to say, of course, that plastics are not in intense competition with traditional materials, and it is thereof of interest to us in the plastics industry to see the battle from the other side.

According to *Materials Research and Standards*, the ASTM journal for May 1961, Vol. 1, No. 5, p. 399: 'Fred O'Flaherty, of the Tanners' Council Laboratory, told the Research Committee of the Joint Committee on Leather . . . what to look for in properties of such competitive materials. In consideration of test methods to be used in evaluation of synthetics, there are three distinct areas of interest — serviceability, comfort, and aesthetics. Leather, in most instances, is used under dynamic conditions, and therefore dynamic tests are needed to evaluate serviceability. Some of the tests used for evaluating serviceability include abrasion resistance, water absorption, ageing, strength and resistance to mould and perspiration.

'A different group of tests measure comfort factors and include fit or adjustability, stretch memory, hand or feel, thermal conductivity, and several others. As for aesthetics, there is not only the matter of colour and colour matching but also the feel of the material and the ability of the synthetic to adapt itself to the styling of the item. He pointed out that the competitive situation of synthetics with shoe upper leather is similar now to the situation that existed when synthetic sole materials of the rubber-resin blend type were introduced. Current statistics on sole leather show that it commands only 28% of the market, the rest being synthetics'.

Thus, as so often happens, a new material's arrival has forced the older material to look more closely and fundamentally into the properties, conditions, and requirements for the job in hand. More than that, in fact, the new material has itself indicated the lines along which the older material should go to meet competition.

As Mr O'Flaherty himself said: 'The [leather] industry must accelerate its research programme and the development of adequate means to evaluate the subtle properties of leather in comparison with competitive materials'. The committee concerned completed work on several test methods including colour fastness, perspiration resistance, dynamic water resistance, stitch-tear, and cold-crack testing.

Cellular Concrete

Looking through *I/EC* for November 1960, I came across an account of an unusual type of foam, the cellular concretes used for walls, roofs, and floors. Conventional concrete has a density of about 140lb. per cu. ft.; some of the cellular concretes now being used are as low as 25lb. per cu. ft.

Some of the problems of producing concrete foams are those encountered in latex foam and plastic foam work *i.e.*, the creation of the foam and its stabilization especially in the presence of polyvalent ions. The matter was discussed by E. J. Koloseus and G. B. Geyer of National Foam System Inc., in a lecture to the American Institute of Chemical Engineers.

Three methods are said to be in commercial use: foaming by means of hydrogen evolved by adding aluminium powder to the concrete mix, preforming, and autoclaving; whipping air into the concrete mix containing an entraining agent; and adding a stable, preformed foam to the concrete mix. It is the last which is described and illustrated on page 28A of *I/EC* for November 1960, but there is still another method which I outline below from the German Press.

A foam-producing liquid consisting of an aqueous solution of a foaming agent, usually a partially hydrolysed protein, a glycol or alcohol solvent, a stabilizer such as ferrous or aluminium chloride or sulphate, and a germicide such as a mercury salt or a chlorinated phenol is continuously foamed with air at 100psi. The foam is blended into the concrete (neat or aggregate) in a conventional mixer. The foamed mixture can then be carted, poured from a hopper, or pumped with very little increase of density, though it is said that a surface-active agent is sometimes incorporated. CHARLES JENNINGS

MEN and MATTERS

A Review of People and Events

by Peter Richards

ABOUT a hundred acres of sand dunes at Baglan Bay (between Port Talbot and Neath in South Wales) have been cleared and levelled. Contractors have moved in. Soon the ground will swarm with pipes, and shining steel towers will go up — and British Hydrocarbon Chemicals Ltd. will have another petrochemical complex; a Welsh Grangemouth, if that does not sound too Irish.

While the plant is being constructed, the men to run it are being appointed. This week it was announced that G. Peters will be the works general manager. Mr Peters certainly has the experience for this heavy responsibility. He was formerly works manager with BHC at Grangemouth from 1952 to 1955.

The £10m. Baglan Bay plant is expected to go on stream late in 1962, and, initially, is expected to give direct employment to 400 people.

Tactical Withdrawal

Selling in any area is a tough job — but selling in the Congo over the past year has been particularly tough. Goodyear salesman Bill Jurg, however, not only went well over his sales quota, but for his work has won the company's Paul W. and Florence B. Litchfield as the 'best all-round salesman' of the Goodyear International Corporation for 1960.

The revolutions and counter-revolutions in this African trouble spot made business impossible, and Mr Jurg played an important part in Goodyear's tactical withdrawal from the Congo. Early this year he was promoted to the position of zone sales supervisor for Africa, based at Lagos, Nigeria.

Mr Jurg has received his Litchfield gold medal from Mr S. Meyer, the managing director of Goodyear (UK), at a special dinner in Manchester.

Plastics and the Gardener

Commercial Plastics is carrying out a very interesting campaign aimed at the amateur gardener. The company's latest move has the theme 'make your glasshouse a greenhouse', and rests on a new pack of 10ft. x 8ft. green polythene sheet for shading a glasshouse during the summer months.

By using this sheet the company claims that the correct degree of shading is obtained.

Most plastics manufacturers seem to have aimed at the consumer inside rather than outside his house. With the amount of time that the average Englishman spends in his average garden, I should think there is a good market to be tapped here.

Reichhold Appointments

When W. H. Breuer, chairman of Reichhold Chemicals Ltd., met his tragic death in a car accident in Germany this April, G. S. Bache was appointed acting chairman. He has now been formally appointed chairman, and Dr G. Swann has been appointed to the Reichhold board to fill the vacancy.

Dr Swann is the assistant managing director of the Reichhold subsidiary, Beck, Koller and Co. (England) Ltd.

Companies in the Reichhold group include Vinyl Products Ltd. and Vinatex Ltd.

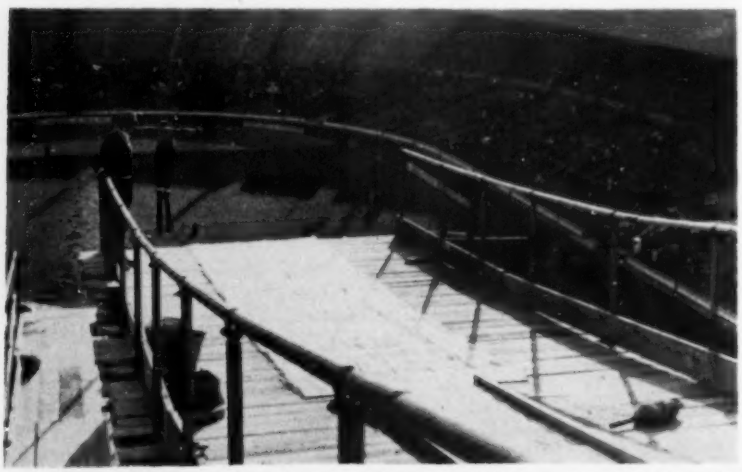
Pvc Snow at Wembley

Although the British summer has a bad reputation among holiday-makers, one thing it usually does not do is snow — which is unfortunate for the Ski Club of Great Britain, which organized the recent international ski-jumping display at Wembley.

The club turned to plastics for a solution, and lined the take-off area with pvc monofilaments, arranged as a series of overlapping mats and stapled to a 130ft. long ramp.

This is believed to be the first time that monofilaments have been employed in this country for ski-jumping. Other materials — such as sand and pine needles — have been tried, but plastics do a better job and have the added advantage that they can easily be recovered for use again.

Rapid handling of the monofilament mat — made from Bakelite's Vybak pvc — was a feature much appreciated by the organizers of the Ski-Jump, because the 150ft. tall stand had to be erected very quickly to avoid interference with the crowded Wembley programme.



A slip-way of 'pvc snow' lines the take-off ramp at the International Ski-Jumping Display at Wembley. *(See — Pvc Snow at Wembley)*

Tyres and Rookies

'Yankees — Stengel left Houk well-fixed. The rebuilt Yanks have everything but guaranteed pitching. The Skowron-Richardson-Kubek-Boyer infield jelled in '60 and the outfield, with Mantle and Maris, has a lethal wallop. There's a catching surplus. All that's needed is a couple of big winners among Ford, Turley, Ditmar, Terry, Stafford, Coates and McDevitt — maybe not even that'.

Well, this is one way to sell rubber products. It is a 'team size-up' from 'Baseball Facts 1961', published by G. F. Goodrich. The wallet-sized booklet contains three tyre advertisements sandwiched between league facts and figures, pace-setters, stadium directions, catchers, pitchers, outfielders, infielders, rookies, ballpark

diagrams, rosters and pennant winners. A sobering list for me, since, in my English fashion, I used to think of baseball as just a commercialized form of rounders.

Digging For Facts

W. S. Penn has left Richard Klinger Ltd., where he was manager of the synthetic rubber and plastics division. In recording this I am happy to welcome him as a colleague — since he has been appointed consultant editor of RUBBER AND PLASTICS WEEKLY. Mr Penn will be no stranger to readers of this journal, who will remember the many excellent articles he has contributed, such as the series on 'Plastics in Cables' which appeared last year. A new series by him — on pvc stabilizers — will be appearing shortly.

Mr Penn — who has spent all his working life in the polymer industry, with Johnson and Phillips, BICC and other companies — is the author of 'High Polymeric Chemistry' (Chapman and Hall), 'Synthetic Rubber Technology' (Maclaren and Sons) and just coming off the stocks is 'PVC Technology'. The latter book, which will be published later this year by Maclarens, will certainly fill a gap in the polymer technology field.

Mr Penn has joined the select band of rubber and plastics consultants, and will operate from 27 Dobson Road, Gravesend, Kent. When he is not digging for facts for his clients he will be doing some digging on his own account. He is a keen archaeologist and has been Director of Excavations at a Roman site in Kent for many years, carrying out excavations on behalf of the Ministry of Works.

Award for Armoride Chemist

H. Shepherd, chief chemist of Armoride Ltd., was awarded the MBE in the recent Birthday Honours.

He has specialized in the problems associated with the production of coated fabrics and has carried out considerable research on materials supplied to the Admiralty and other government departments.

Mr Shepherd represents Armoride Ltd. on various technical committees, including those of the Leathercloth and Coated Fabrics Manufacturers' Association and the British Standards Institution.

Travelling . . .

D. M. Edwardes, general sales manager of Dunlop's general rubber goods division, Manchester, has left England for a three-week tour of the division's North American market.

His itinerary includes, New York, Detroit, Chicago and Montreal.

Appointments in Brief

Dewhurst and Partner Ltd. of Hounslow, has appointed R. A. Nisbet, regional manager (South). He has been with the company for 17 years and was formerly group controller for the Southern region.

* * *

Ben F. Jones, technical superintendent of the B. F. Goodrich aircraft wheel and brake plant, has been appointed director of product planning for B. F. Goodrich Aviation Products and will make his headquarters in Akron, Ohio.

Polly Ester Says . . .

'Compressive strength — I shall need it for my holiday packing'

THE LEGAL ANGLE

Trials and Tribulations

By a Barrister

'G. V. Taylor, Works Manager at the Newport Factory of Monsanto Chemicals Ltd., is to retire on June 1'.—RPW, May 13, 1961.

The end of another distinguished career in the industry — and, we hope, the beginning of a long and very happy retirement. But we wonder how it all began? Did Mr Taylor — like so many others — begin his career with a trial period? After all, many employers believe that they can only successfully assess a person's capabilities by seeing him on the job.

We know a case, for instance, where a man was taken on as a foreman in a rubber plant. He was given a montht's trial. After a week, the company decided that it did not like him. He seemed to be causing ill feeling amongst the men, and his work was nothing special. He was called into the office, given his pay to date and his cards.

'I want a week's wages in lieu of notice,' he demanded.

But he did not receive it. 'After all', said the plant manager, 'you are here on trial'.

The man went to his lawyer — and was told the law about trial periods.

The fact is that he had been wronged. He had been engaged for a period of time — a fixed period — and whether it was called a period of trial was neither here nor there. He was assured four weeks' work — and four weeks' pay.

'But surely, if an employee on trial does not know his job, you do not have to keep him?'

The situation is no different from any other kind of employee. If you have grounds for summary dismissal, then you can pay him to date and show him to the door. But if you have no such grounds, he must be given his notice or wages in lieu. So if he steals, reveals your secrets to a competitor, gains the job by claiming knowledge of the industry which he does not possess; if he is persistently rude, careless or late; if he smokes on the job and causes a fire . . . in fact, if he so behaves himself as to repudiate his contract: then you can give him the summary sack. But, otherwise, he must receive his proper notice or wages in lieu.

'So the man you mention was entitled to a week's notice?'

He was entitled to more than that. He was entitled to be paid for the balance of the trial period. He had done nothing which warranted summary dismissal, so the lawyer advised him to claim pay for the rest of the period for which he was engaged. This he duly did — as he had been able to obtain no other work during that three weeks, he won his case — completely.

PRINCIPLES OF ADHESION

Continued from page 1008

elongation at break; in other words the curve became much steeper as the percentage of chlorinated rubber increased. The peel figures on duck/

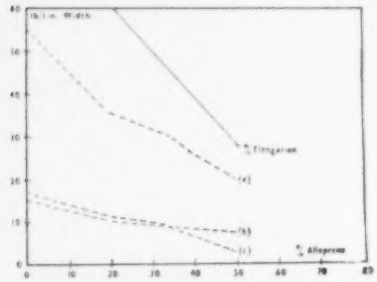


Fig. 4. Variation of peel strength of neoprene compound with % of chlorinated rubber

duck, duck/steel and duck/rigid pvc all followed the same pattern: the resistance to peel fell as the elongation fell while the Alloprene content increased.

The relation between elongation and lap-shear strength for the same concentrations of chlorinated rubber showed the reverse trend, *i.e.* a gradual rise in shear strength as elongation fell reaching a plateau around a concentration of 40% of chlorinated rubber (Fig. 5). These phenomena applied to room temperature measurements only and the effect at higher temperatures was different.

Cleavage strength was very rarely quoted in reference works, said Mr Vohralik, and its use obviously had its limitations. The main usefulness of such information lay in the ability to indicate how an adhesive would resist service damage and ability to

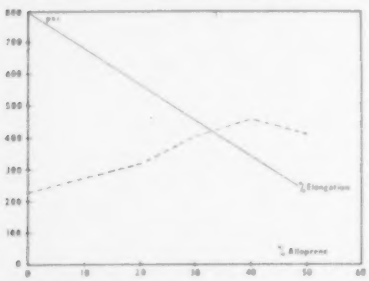


Fig. 5. Relation between elongation and lap shear strength for the same concentration of chlorinated rubber

withstand further processing after assembly. Cleavage data was also useful when dealing with materials which were thermally unstable and had a tendency to curl, such as Melamine/phenolic laminates.

Impact Strength

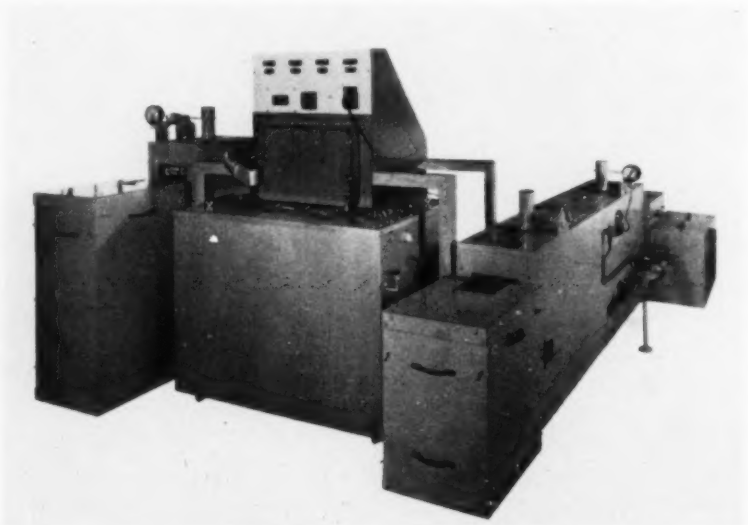
Impact strength data has its usefulness in indicating embrittlement at room temperature, in particular when dealing with polymers which would rapidly crystallize at room temperature.

From this it would appear that somebody familiar with the basic principles discussed could either design a joint around a given type of adhesive or alternatively he could find the right basic type of adhesive for any given joint design. For example for certain types of aircraft work, because of temperature and solvent resistance, epoxy adhesives had to be employed. It was therefore obvious that the joint must be so designed as to give the minimum peel effect at any time during the service conditions and all the load should be borne, if possible, either in shear or direct tensile. To exemplify the other instance, when an adhesive must have reasonable shear and direct tensile characteristics and at the same time adequate peel resistance one could not possibly choose a rigid resin type adhesive, but one would choose either a synthetic rubber/resin or vinyl/phenolic adhesive.

Special Dip Coating Plant

USES FLUIDIZED POWDER TECHNIQUE

A RECENT advance in the plastics coating of components and finished articles is the 'fluidized' powder technique. The chief advantages claimed for the process are: (1) Excellent chemical resistance; (2) equally suitable for one-off or mass production; (3) negligible raw material wastage; (4) attractive and durable finish; and (5) no fire hazard through the use of solvents.



Semi-automatic plant developed by Lionel Hook and Sons Ltd. for applying a plastic finish by the fluidized powder technique

Pictured is a semi-automatic plant, recently installed at the Birmingham works of Guest Keen and Nettlefold (Midlands) Ltd., for applying a decorative and functional plastics finish to a range of hooks by the fluidized powder method.

The plant was developed by Lionel Hook and Sons Ltd. of Ebley, Stroud, manufacturers of machinery for the latex and pvc dip moulding and control dip finishing fields.

The equipment consists of: a preheating oven with variable-speed chain conveyor; a central unit housing all the electrical control gear and fitted with a conveyor and suitable flight bars for immersing the hooks into the powder for a predetermined period; a device for the collection of surplus powder after dipping and a final curing oven through which the hooks are moved on a third variable-speed conveyor.

The polythene powder used is Telcothene and the fluidizing tank is a Dipkota, both produced by Telcon Plastics Ltd.

A feature of this plant is the method of handling and dipping which avoids the deposit of plastics on the screw portion of the hooks. It is said to be the forerunner of a general purpose unit, now under development by Lionel Hook for similar work with thermoplastic powders.

Plastics Statistics

APRIL EXPORTS AND IMPORTS

PLASTICS materials exports in April 1961 showed a rise in tonnage over the preceding month, but a drop in value: 16,859 tons (£3,615,984) were exported, compared with 15,881 tons (£4,003,188) in April 1960. The March 1961 figure was 15,432 tons (£3,502,397). This position is revealed by the official Trade and Navigation accounts, which show that the biggest quantity was taken by Hong Kong (1,166 tons) followed by South Africa (927), Sweden (890), India (715) and Western Germany (675).

Imports continued their substantial drop; during the month they were 5,425 tons (£1,927,989) compared with 7,380 tons (£2,528,637) in the same month last year. Western Germany was the main supplier with 1,370 tons, followed by USA with 1,320 tons. Imports for the first four months of the year stood at 24,927 tons (£8,833,420), compared with 29,880 tons (£9,600,045) at the end of the same 1960 period.

Exports for the first quarter totalled 66,916 tons (£15,091,097) compared with 60,348 tons (£15,368,184).

Details of imports of plastics materials during April 1961:	Tons	£
Acrylics	261	86,452
Alkyd solid and liquid resins, solutions, emulsions and dispersions	193	37,812
Cellulose plastics:		
Acetate butyrate	42	46,704
Photographic (including cinematograph) film base (except acetate butyrate)	115	149,646
All other	135	111,764
Polyamides	101	92,558
Polystyrene	312	82,592
Polyvinyl chloride:		
Polymers and copolymers	1,558	240,144
All other	669	228,645
All other	2,039	851,672
Total	5,425	1,927,989

Export of plastics materials during April 1961:	Tons	£
Acrylic sheet, rod, tube, film, foil and profile shapes in primary form	695	408,865
Alkyd solid and liquid resins, solutions, emulsions and dispersions	510	92,513
Aminoplastics:		
Solid and liquid resins, including solutions	1,136	140,750
Moulding and extrusion compounds	599	105,867
Cellulose plastics:		
Moulding and extrusion compounds	277	88,808
Sheet, rod, tube, film (excluding regenerated cellulose), foil and profile shapes in primary form	214	132,307
Phenolics and cresylics:		
Solid and liquid resins (straight and modified)	860	141,991
Other	675	220,104
Polystyrene	1,316	235,998
Polythene (polyethylene) sheet, rod, tube, film, foil and profile shapes in primary form	127	49,776
Polyvinyl chloride:		
Polymers and copolymers	1,675	208,967
Moulding and extrusion compounds	1,131	228,746
Sheet	750	305,950
Other	58	18,700
All other	5,867	1,132,122
Waste and scrap (including celluloid and film waste and scrap)	969	104,520
Total	16,859	3,615,984

UK exports to countries in the European Economic Community (Common Market) and the European Free Trade Association are shown below.

EXPORTS TO EEC

	Apr. 1960	Apr. 1961
Western Germany	427	675
Netherlands	603	658
Belgium	696	700
France	2,260	670
Italy	676	587
	4,662	3,290

Exports to Commonwealth countries during the month were 4,808 tons (4,481 in April 1960) and exports to all other foreign countries were 5,488 tons (4,109 tons).

EXPORTS TO EFTA

	Apr. 1960	Apr. 1961
Sweden	814	890
Norway	387	520
Denmark	789	613
Switzerland	263	421
Portugal	230	580
Austria	152	249
	2,635	3,273

(Any apparent discrepancies are due to rounding off of figures)

Rubber Statistics

FRANCE — MALAYA — THAILAND

RUBBER consumption in France in March 1961 was 20,534 tons, compared with 21,077 tons in the same month last year. The French Ministry for Industry and Commerce has issued the following statistical breakdown (in tons):

	March 1961	March 1960
Comprising:		
Natural rubber	10,870	11,244
Latex	1,208	1,358
Synthetic rubber	8,456	8,475
Total	20,534	21,077
SYNTHETIC BREAKDOWN		
Butyl	1,238	1,102
SBR	5,890	6,100
Others	1,063	1,057
Artificial latex	265	216

French tyre production in April 1961 is estimated at 22,850 tons compared with estimated output for March of 24,460 tons. This brings total estimated production for the first four months of this year to 92,880 tons compared with 89,925 tons in the same period in 1960.

Imports of tyres in March totalled 1,138 tons and exports 5,641 tons, bringing total imports for the first quarter of this year to 2,727 tons compared with 2,089 tons in the same period of 1960. Exports in the first quarter of 1961 totalled 14,893 tons compared with 17,145 tons in the same period in 1960.

Industrial rubber production in April is estimated at 18,300 tons compared with revised March estimates of 19,700 tons bringing total output for the first four months of this year to 75,010 tons compared with 74,765 tons in the same period in 1960.

Malaya

Imports of rubber into Singapore and Malaya during May amounted to 42,695 tons as shown by final documents received, according to preliminary figures issued by the chief statistician.

This figure includes 23,216 tons imported on provisional permits in previous months for which final documents have been received and excludes approximately 19,060 tons imported during the month for which final documents have not yet been received.

The comparative figures for April were 33,878, 13,485 and 24,640 tons respectively.

Thailand

Thailand exported 21,700,740 kilos of rubber of all grades during March this year, according to trade estimates.

This compared with 17,024,080 kilos exported in February and 19,047,565 kilos in March 1960. Main countries of destination in March 1961 included:

	March 1961	March 1960
USA	5,263,540	6,226,496
Japan	4,387,559	4,890,885
West Germany	2,906,715	1,724,343
UK	2,731,003	152,860
Malaya	2,001,483	2,326,010
Singapore	1,667,056	2,480,534

(all figures in kilos)

COMPANY MEETING

Kuala Lumpur-Kepong Amalgamated Limited

MR H. F. COPEMAN ON GROUP'S EXPANSION

THE fifty-fourth annual general meeting of Kuala Lumpur-Kepong Amalgamated Ltd. was held on June 15 in London, Mr Harold F. Copeman, chairman and managing director, presiding.

The Chairman stated at the meeting:

In amplification of my statement issued with the report, I have to advise you that the total crop harvested from all the estates in the Group amounted to 23,204,265lb. for the eight-month period from October 1 last to May 31, which shows an increase of just over 100,000lb. over the comparable period in the previous year. I think it is desirable to point out, however, in giving you these figures, that they will not agree with any figures you may be given in the next annual report, because of the different accounting dates of the new subsidiaries; I give them merely as an indication of progress.

Although this is a rubber producing company, we have in the past had a fairly large income from tin in respect of the areas leased off to mining companies. Over the past two or three years, this income has been negligible, in view of the incidence of the tin restriction scheme. Operations have, however, been resumed, and I hope to see a considerable increase in receipts, at any rate for the next few years.

I am, however, a little surprised at the delays which occur in applications to the Government for variations of leases. In the case of one of the areas leased for tin, application has been made by the mining company for a variation of the lease (which was granted only for dredging purposes) to allow open cast mining in view of the improved methods and the prospects of recovering a greater amount of tin. It is eight months since the application was made and we are still waiting to hear the result. This delay is somewhat inexplicable when we consider the recent reports about tin areas rapidly being depleted, the considerable amount of new prospecting that is being done and above all the urgent need of Malaya for the revenue accruing therefrom. This application if granted will improve to a small extent our revenue from tin.

Another matter of delay in regard to mining arises from an application for conversion from an agricultural lease to a mining lease, which was made some seven months ago, in respect of an area we had sold for iron ore mining, the sale being subject to conversion of the lease. The latest news of this is that it is expected to come before the State Council later this month. If this application is successful, it will mean an accretion of approximately £140,000 to our cash balance, a welcome addition, in view of the large replanting programme still ahead of us.

We have had one or two enquiries as to the dividend policy and in reply I have said that the policy as expressed in the circular of October 31 last to the shareholders of Kuala Lumpur and its present subsidiary companies still stands; that is to say, that we propose to pay an interim dividend in September next. It is anticipated that this interim dividend will be 5% net, which is equivalent to just over 8% gross. It will be appreciated that the fall in the price of rubber will affect the dividend policy of all plantation companies.

Group Expansion

In his circulated statement to shareholders the chairman said:

Before dealing with the activities for the year under review it may, I think, be of interest to our many new shareholders if I briefly review the expansion of our company, particularly in the course of the past few years.

Early in 1957 we held our fiftieth annual general meeting and a short review of the 50 years' working accompanied the report and accounts for that year. During those 50 years the issued capital was increased from its initial figure of £180,000 to £462,250 and the planted area from 1,582 to 9,683 acres. The following year a small increase was shown both in capital and acreage. At the annual meeting held in 1959 we reported an increase in the issued capital to £685,665 and in area to 13,628 acres, following on the acquisition of the balance of the capital of the Sungei Chermang Rubber Co., in which we held a large minority shareholding and which is now in voluntary liquidation.

In August 1959, offers were made for the capital of the Jeram and Tamiang companies, followed in November of the same year by an offer to the stockholders of Eastern Sumatra, with its wholly - owned subsidiary, Sungei Kahang. As a result of those offers we now hold 84.1% of the Jeram share and debenture capital, 97.9% of the Tamiang capital, and 100% of the capitals of the Eastern Sumatra and Sungei Kahang companies, and our issued capital was increased to £1,398,796 and the planted area to 33,770 acres.

It is interesting to recall that the Jeram company also has a history of expansion prior to its acquisition by this company. In 1955 Jeram purchased the Seventh Mile Estate of 1,257 acres, in 1957 Coalfields Estate of 1,139 acres, and at the end of 1958 Tuan Mee estate of 1,484 acres. With those acquisitions and with new plantings Jeram increased its planted area from 2,441 to 6,707 acres.

Bringing the history of Kuala Lumpur up to date, offers were made on October 31 last to the members of the Caledonian (Selangor), Glen Muar, Kepong (Malay), Kuala Kangsar, and Tanjong Malim companies, following on which our issued capital has been increased to £3,438,157 and the planted area controlled in the East to 83,395 acres. With the exception of 8,703 acres in Sumatra all the areas to which I have referred are in Malaya, but one must not overlook the Kepong subsidiary, Oban (Nigeria) Rubber Estates with 6,886 planted acres, and the other shareholding interests in plantations in Nigeria.

With the acquisition of Kepong and the other companies in the latest amalgamation Kuala Lumpur's name was changed to Kuala Lumpur-Kepong Amalgamated Ltd.

Accounts

The extent of our interest in the main subsidiary companies is given in the report and I need only add that Kepong Plantations, Buntar and Oban are subsidiaries of Kepong (Malaya) and that, following on a reduction of the capital of Eastern Sumatra, the Sungei Kahang company is now a direct subsidiary of Kuala Lumpur-Kepong Amalgamated. It will be appreciated that the accounts now submitted to you cover only the companies in the group at September 30 last and take no account of the latest amalgamations. In addition to the profits which have accrued from the estates directly owned, we have taken into account the following:

Jeram. A dividend of 9d. per share gross, equivalent to 37½%.

Tamiang. A dividend of 15% free of tax equivalent to 24¼% gross.

Eastern Sumatra. A dividend of 35% gross; the profits from which this dividend was paid included the profits of the Sungei Kahang company. In addition to that dividend, account is also taken of a capital distribution of £20,000 from profits realized by the sale of investments.

I take this opportunity of reporting that a remittance of £27,513 has

recently been received from Indonesia, being the remittable profit for 1957.

Kuala Lumpur. It will be recalled that, in view of the offer made on October 31 last to acquire the shareholdings of other companies, an interim dividend was paid on December 5 and it was stated at the time that no final dividend would be paid. The reason for that was, of course, that the shares issued in respect of the offers were made *pari passu* with the existing shares of Kuala Lumpur excepting that they carried no entitlement to that dividend.

Since the close of the financial year a number of my co-directors and myself have been to the East. We took the opportunity of visiting the estates of the group, and indeed I visited all our estates in Malaya and the Bukit Maradja estate in Sumatra. It was not possible in the time at my disposal to examine every estate thoroughly, my aim being to obtain a general picture of all the estates and to meet the staff. I am able to report that we found them all, on the whole, in good condition, and efficiently managed.

Planting Policy

The acreage statement annexed to the report shows that out of nearly 75,000 acres held in Malaya, there are nearly 29,000 acres of old rubber; this means that 39% of our Malayan rubber has still to be replanted. It is essential, if full competitive power is to be available against the synthetic products, that this old rubber be dealt with as quickly as possible. The rate of rejuvenation must, however, depend upon the finances available and in that connexion it must be borne in mind that the replanting of any given area involves expenditure which gives no return for some six to seven years. It may well be that this period will be shortened by as much as two years, if some of the new clones now under test by the Rubber Research Institute should live up to their promise. The period of immaturity can also be reduced by the use of selected clonal seedlings and advantage will be taken of the best material that may be available from time to time.

With a view to diversification it is proposed to replace some of our old rubber with oil palms. Preliminary reports indicate that soil conditions on one of our larger estates are satisfactory and it is hoped to make a start before the end of this year. One advantage of oil palms is that they mature in three to four years.

So far as concerns the future, it is generally agreed that world consumption of rubber over the next 10 years will steadily increase; it is obviously in our interest that as much as possible of the demand must be met by natural rubber. That demand, however, will only be met to the utmost by natural rubber if the price is competitive with synthetic, and that can only be done, so far as one can see at present, by increasing the yield per acre, which in its turn means a progressive replanting policy. One is sometimes apt to forget that in ten years hence the rubber replanted in the late 1930's will be over 35 years old and past its prime. It is essential, therefore, that all companies build up and maintain ample liquid resources so as to ensure that replanting can continue even if profits should be seriously reduced.

As you are aware, our principal interests are in Malaya. Up to the present every encouragement has been given to the plantation industry by the Malayan Government. Having attained self-government it would not be unnatural if first thoughts tended towards their own nationals rather than towards expatriates. It is only proper to say that there has been so far no undue bias against the European and so long as that continues we shall be able to play as valuable a part in the economic welfare of the country as in the past.

Directorate

Since our last general meeting Mr Marshall, Mr Scott and Mr Simpson have joined the board and, in accordance with the Articles of Association retire from office. Mr Douglas and Mr Calver also retire from office. I take this opportunity to thank them for all their support and advice and cordially recommend their re-election.

In conclusion, I have also to express our thanks to our local agents, visiting agents, managers and staff for their hard work and loyal co-operation throughout the year. I would pay a special tribute to Mr Holms, who for very many years was manager of Eastern Sumatra's estate in Sumatra. For the past few years he has been the general manager and visiting agent of our agents in Sumatra and has now retired after over 35 years in Sumatra. His services, particularly since the war, have been extremely valuable and we wish him a long and happy retirement.

The report and accounts were adopted.

Plantation Newsletter

CUT-THROAT COMPETITION BETWEEN NR AND SR

FROM KUALA LUMPUR

WRITING in *The Straits Times*, Leo G. Logan has put forward the view that, now the post-war sellers' market has ended, cut-throat competition between businesses and countries to sell either natural rubber or synthetic is now the order of the day.

by our Malayan Correspondent

He hits at many who still dream that the natural rubber industry is still as it was 50 years ago, saying that, in fact, it is no longer a question of synthetic trying to equal natural rubber but of natural trying to equal synthetic.

He quotes a chemist in a synthetic plant in Britain as having said: 'We consider our product in no way inferior to natural rubber and in many ways it is superior'.

Mr Logan says there must be a limit below which it will be unprofitable to produce synthetic, but suspects that this limit is now lower than what the 'experts' have hitherto proclaimed it to be.

Writes Mr Logan: 'If confidence in the future of natural rubber is shown by the amount of re-investment, it must be admitted the synthetic industry is even more confident of its future, since its investment is many times that of the natural rubber industry'.

Referring to the Rubber Growers' Association, Mr Logan says that he has heard different opinions from them on the subject of research.

'If they refrain from making unrealistic wage demands', has a very familiar sound and means, as it always has meant, the workers must do more for less pay, writes Mr Logan.

He suggests that the chairman of the RGA should first get the workers in the United Kingdom to follow this policy. Employers in the UK seem to have been singularly unsuccessful in doing so, why should they expect Malayan workers to accept it, he asks.

Mr Logan says that the chairman (of the RGA) appears to be unaware that the workers' position in Malaya has changed very considerably. Like their UK opposite numbers they now have the vote and political power is in their hands.

Saying that many seem to be quite incapable of realizing the dramatic changes of the last five years, Mr Logan says: 'What purpose is served by the dreary repetition of the past history of the industry concerned in the address of the chairman, Sir Eric Macfadyen, to the Rubber Plantations Investment Trust Ltd?'

He adds: 'The confusion of these old gentlemen is well illustrated by the last paragraph of his address which is directly opposite to the views of the chairman of the RGA'.

Rubber stealing on estates in central Malaya is decreasing, according to monthly returns of incidents reported to the Selangor Planters' Association.

In the first five months of this year, 75 cases of rubber thefts were reported from estates in Selangor — an average of 15 a month. Last year, the average was 21 thefts a month.

Planters believe that the preventive measures now in force are beginning to prove successful. However, in the past, it has been noted that thefts tend to decrease when the price of rubber is comparatively low.

The Association works in close collaboration with the Police in supplying them with all details of known rubber thefts. In order to assist the police, the Association has made available maps pin-pointing the location of thefts. These are also made available to rubber inspectors.

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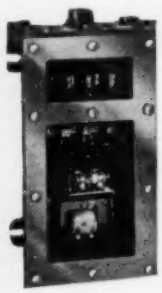

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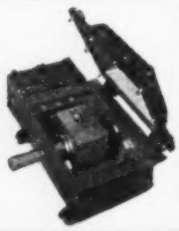
Most types of Pressure Switch in our list 119/G can be supplied in Buxton certified flameproof form.



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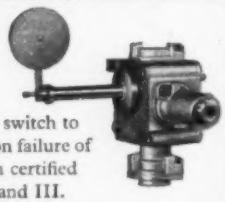
Type AFS/FP, a switch to operate contacts on failure of air flow is Buxton certified for Groups I, II and III.



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Plantation Share Survey

ONE of the most interesting reports from a company to fall on my desk recently came from the well-known RUBBER PLANTATIONS INVESTMENT TRUST. This firm is headed by the very able Sir Eric Macfayden, who, one must admit, sets a high standard with his annual reports to shareholders. In this year's effort Sir Eric says that in the foreseeable future a wide field of use may open up for the blending of natural rubber with different synthetic materials. Whatever the basic materials with which the technology of this ever-expanding industry may, as time goes on, concern itself, none is likely to be more acceptable than the plantation article at the right price. And on price a good Malayan plantation need not be afraid of competition.

Malaya, where most of the group's rubber interests are located, attained an output of 710,500 tons last year out of a world total of 1,985,000 tons of natural and is now firmly re-established as leader among the rubber-growing countries. In 1959 demand for rubber was running at a rate of 1½m. tons a year more than in 1950, while supply of natural had increased by no more than 200,000 tons per annum. The shortage was made up by synthetic rubber produced until 1954 under Government auspices, mainly the USA. During 1959 the prospect of continued shortage of natural and of unhealthily high prices led to the USA and the UK Governments both deciding, with the agreement of the producing countries, to start releasing rubber from their strategic stockpiles at agreed rates and prices.

Standard rubber in London for spot delivery touched the peak of 3s. 6d. per lb. in May of last year, Sir Eric reminded shareholders. The de-stocking policy worked, however, and in June of 1960 a price decline set in which had brought the market down to about 2s. before the end of the year. 'For the time being, the indications are that a price of slightly above 2s. a lb. will call out a high proportion of available natural rubber at a reasonable profit to producers and a sufficiency of synthetics to satisfy the world's present demand for all rubber and rubberlike materials'.

Sir Eric pointed out that until the last few years commercial synthetic rubber was synonymous with the SB rubbers improvised under the stimulus of war needs in the 1940's. Between these materials and natural rubber there was an unbridged gap in quality. Tree-grown rubber was said to be irreplaceable 'for instance in the pneumatic tyre'. The so-called stereo specific rubbers now challenge that claim. 'If these newcomers proved to be, in fact, comparable with nature's product in physical make-up natural would still possess a very real advantage in cost of production. In the foreseeable future a wide field of use may open up for the blending of natural with different synthetic materials and we are likely to see the elaboration of new combinations, of plantation grown with man-made products.

Gross revenue of the new trust for the year to March 31 1961 was £367,400 (£305,800). After taxation allowance and expenses the company's net revenue is returned at £199,300 (£160,700). Sir Eric and his fellow directors have recommended an increase in the dividend from the 13½% paid last year on the smaller capital to 14% plus a 1% bonus, making 15% in all. This will mop up £174,700 (£142,900) and will leave £158,600 against £133,900 to be carried forward. It is pointed out that the heavy charge of profits tax of £24,500 compared with £14,500 arises from the fact that the trust is liable to this tax on a substantial portion of the dividends received from plantation companies which have qualified as Overseas Trade Corporations.

Up until five years ago the trust income has been derived almost wholly from dividends received on rubber and tea shares. Since then the board's policy has been clearly to seek greater stability of income by 'spreading our investments more widely. Excessive fluctuations are apt to occur in the market values of plantation shares often due to effects upon the commodity markets of quite extraneous influences and, while rubber particularly is likely to remain the Trust's largest single interest, I would not exclude the prospect of diversification of investment being carried somewhat further when that may appear to be in the interest of stockholders'.

WATERFALL (SELANGOR) RUBBER ESTATE, which had a trading balance of £6,392 in the year ended September 30 1960, to reduce the debit balance carried forward to £181,319, plans to reduce and reorganize the share and loan capital, as previously intimated.

The undertaking is at present in possession of a receiver for the 7% debentures but the balance of that stock will be paid off with interest on June 30 next. The company also has £30,000 in 5% loan stock with interest arrears amounting to £28,125 gross as at last September.

It is proposed under the scheme to write down the 2s. shares to 6d. each, to consolidate them into 1s. shares, and to cancel accrued interest on the notes. Holders of Loan Notes will be allotted 30 shares of 1s. each in respect of each £1 nominal stock held against their entitlement of 32s. being £1 capital and 12s. net interest.

The Receiver for the debenture holders says the estate will stand at approximately £50 per acre and that with rubber at its present price a profit is being made and in his view the company has 'every chance of a profitable future'.

GRAND CENTRAL INVESTMENT HOLDINGS, whose main operating company is GRAND CENTRAL (CEYLON) RUBBER ESTATES, is reducing its dividend from 20% to 13% with a final of 9% for 1960.

After depreciation of £24,238 (£21,553), group profits of £401,821 compare with £431,584, subject to tax of £242,414 (£223,000). The amount brought in is reduced by £22,000 for under-provided tax. Replanting reserve is allocated £55,102 (£55,984) and capital issue expenses of £4,549 are written off. The dividend takes £100,244 (£151,608) and £80,613 (brought in £81,101) is carried forward.

In view of the uncertainties attaching to the remittance of profits from Indonesia, the directors of BANDAR SUMATRA RUBBER CO. are of the opinion that it would be in the interests of members if the scope of investment in the UK were to be gradually enlarged.

In particular, the directors have in mind investment in property and for this purpose they have co-opted to the board Mr Joel Rabin, a quantity surveyor, who has had considerable experience of the property market over the last 30 years and who is also the holder of a substantial part (29%) of the company's capital.

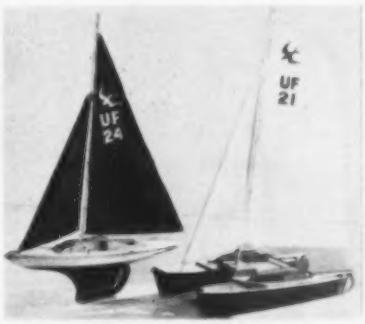
It is emphasized that these proposals relate to the use of part of the funds of the company in the UK and that there is no intention of selling the company's estates in Indonesia.

IRI GOLF

Wallwork Winner

The Institution of the Rubber Industry Golfing Society's Wallwork Cup, 1961, was won by a member of the Scottish section, W. W. Somerville, with a net score of 139.

The match was played at Gleneagles, Scotland. A full report of the meeting will appear in a future issue of *RPW*.



The hull of both the catamaran and the yacht, designed by Uffa Fox, have been vacuum formed by A. Fifer Ltd. from Iridon acrylonitrile butadiene styrene sheeting

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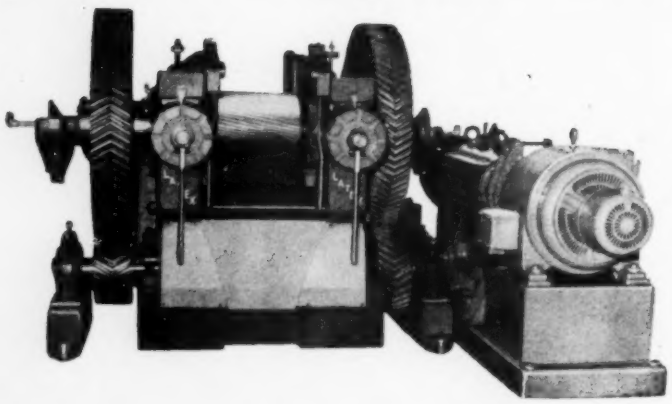

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Industry INTELLIGENCE

Technical Data

Polysar for Conveyor Belts

Polysar technical report No. 65:5A, available in this country from Polymer (UK) Ltd., Walbrook House, Walbrook, E.C.4, is called Polysar Krylene NS and Polysar S-630 in light-coloured conveyor belts.

The report describes cover, skim, and friction stocks which are suitable for use in light-coloured conveyor belts. Polysar Krylene NS was selected for the cover stock because of its good colour, colour stability, elastic properties, and abrasion resistance. Polysar S-630, a non-staining, non-discolouring, easy processing, hot rubber, was used in the carcass stocks, because it can be broken down and mixed without difficulty, to produce skim and friction stocks of suitably low viscosity and good building tack.

Silicone Release Agents

Imperial Chemical Industries range of silicone products has recently been increased by the addition of two materials recommended for use as mould release agents in the rubber and plastics industries.

Resin R206 has been promoted to the full sales range and is claimed to be effective for most materials including epoxy resins.

M402 is a new emulsion of silicone grease in water which gives a more viscous coating to mould surfaces. This is recommended for general mould release applications in both rubber and plastics and the method of use is the same as M400 and M401.

Durez Phenolic Resins

The Durez Plastics Division, whose UK agents are Omni Ltd., 35 Dover Street, W.1, has announced the introduction of four new phenolic resins for use in nitrile rubber compounds which have aroused considerable interest.

Durez 12687 softens the stock during milling to give fast easy milling and rapid loading of filler. Curing with the rubber, the resin imparts increased tensile strength, hardness and rigidity to the vulcanizate. Addition of the resin in quantities greater than about 20% gives a fast cure without the use of sulphur or accelerators.

Durez 12707 is used for scorchy compounds and cures more slowly giving stocks with lower hardness and tensile properties and higher elongation.

Durez 12686 behaves in a manner similar to 12707 and can be used on the Banbury without danger of scorching. Durez 13037 is similar to 12686 but is in liquid form. Its low viscosity allows still more softening of the stock without strongly affecting end properties, permitting easier extrusion and moulding of highly-loaded compounds. This resin is useful for high-durometer stocks for laminating or building up onto fabrics since it produces a residual tack at room temperature which helps the plies stick together.

Machines, Materials and Equipment

Simplified Thermometer Calibration

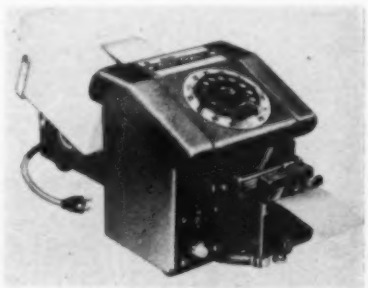
The first British bi-metal thermometer specially designed so that it can be re-calibrated without calling in a skilled technician, has been produced by the British Rototherm Co. Ltd., Merton Abbey, London, S.W.19.

Named the Zero-Re-set, the thermometer was originally planned for installations in countries where there is a high proportion of unskilled labour. The re-calibration procedure is simple. At the lower back of the vertical head of the thermometer is a countersunk instrument screw. After removing this, two turns of a 2 BA Allen key will loosen the locking screw and allow the thermometer stem to be rotated. This rotation moves the pointer and allows adjustments of up to 50% of the scale range. A stop is incorporated in the locking device which makes it impossible to damage the instrument.

The thermometer is at present available with 2½in., 4in. and 7in. dials in the vertical pattern in all standard temperature ranges. Horizontal patterns of this thermometer will be available shortly.

Tape Dispensers

Leon Davis and Co. Ltd., St. Andrew's House, 32 Holborn Viaduct, E.C.1, has been appointed UK selling



agent for the two Marsh electrically-operated taping machines, the Twin-Taper and the Dial-Taper.

The Twin-Taper is an automatic machine that is claimed to dispense, repetitively, two lengths of tape of any given length, each at variance to the other, within the limits of 3in. up to 72in. The dispenser is operated by a fractional horse power electric motor which runs only when actually dispensing. A light pressure on the top or side of a press button will set the motor in motion and an accurately cut off, freshly moistened length of tape will be dispensed.

The Dial-Taper is operated by dialling the length of tape required, in a manner very similar to dialling a number on a telephone, when the length selected is immediately dispensed, freshly moistened and cut off, ready for use. The standard model gives lengths of from 3in. up to 39in. in steps of 3in.

Publications

Barflo Range

Barflo Ltd., 56 Cavendish Place, Eastbourne, has issued a small booklet which shows its present standard range of valves and expansion units.

Included in the range are the remote control valve, suitable for hydraulic and pneumatic control systems; needle valves, suitable for small bore tubing; quick operating tap, ready for fitting to flexible lines; multi-way distributors for use where a number of outlets can be supplied by one inlet; and expansion units which have a compact design to eliminate large expansion loops or bends.

ASTM Guide

One of the services which the American Society for Testing Materials has rendered for several years has been to provide a means by which leading authorities could publish technical papers and reports dealing with the engineering properties and tests of a great many materials and products.

The society has now issued a list of publications. This is arranged to simplify the finding of all books on one subject. It includes essentially all of the society publications. New items added since the last edition (April 1960) are marked. In general, publications are grouped by subjects alphabetically for easy reference. Those relating to two or more subjects have been handled with a minimum of cross referencing where the alternative subjects do not readily suggest themselves.

Copies can be ordered from ASTM, 1916 Race Street, Philadelphia 3, PA.

Philprene Polymers

Phillips Chemical Co., 318 Water Street, Akron 8, Ohio, has published a booklet on 'Philprene Polymers'. This supplies in concise form technical data and practical compound information pertaining to Philprene synthetic rubbers.

Philprene polymers include hot and cold types, pigmented, non-pigmented, oil-extended, and many special types such as low water-absorption polymers for the wire and cable industry.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THE summer term in stock markets has made a disappointing start for investors. Share prices have been forced on the retreat and last week alone the *Financial Times*, an important barometer to the City, showed a fall of 10.8 points. In little more than a month it has dropped 34.7 points or 9½% from the peak that was reached in the middle of May. Sentiment has been sadly affected by the poor performance of the £ over the past few weeks. This has led to rumours that the Chancelleor of the Exchequer will shortly increase the bank rate and introduce other credit squeeze measures to restrain home demand. On top of this the trade figures came as a big disappointment, while the report from the Federation of British Industries was just another bundle of facts and figures that caused further indigestion. One way and another then you might say that the market has had enough to contend with. The outlook at the moment seems clouded with ifs and buts, and my advice to the buyers is to stand on the sidelines for the time being. At their current levels some of the leading favourites could attract the money of some of the institutions who still have plenty of cash for the right kind of share.

Col. Sir William Fenton, head of BRITISH BELTING AND ASBESTOS, takes a quiet but confident view about the outlook for his group. With minor exceptions, the company is assured of full employment throughout the year, he tells shareholders in his annual report. There are several major items of capital expenditure in hand throughout the organization and the future can be looked forward to with confidence. Turnover in the first quarter of the current year continued at a satisfactory level and sales of the parent concern were slightly higher. Part of the increased production capacity mentioned last year has been brought into use but much building work is still in progress and will be several months before output is obtained from some of the new plant which is to be installed.

Good news from AULT AND WIBORG, a company whose shares I recommended last year. Higher profits and increase in profits and a scrip issue on a one-for-four basis was announced recently. Up goes the payment to shareholders by 5% to 30%. Comes from profits which have improved from £824,400 to £956,300. Now standing at 30s. 'ex' the share bonus, the shares offer a return of nearly £5 on every £100 invested. In my view they still offer the opportunity of further capital appreciation.

Declared . . . the terms of the DISTILLERS 'rights' issue which will be offered to holders on a one-for-ten ratio at a price of 32s. 6d. Will bring in £30m. plus for the group. The board intends to declare a final divi-

Continued on page 1027

Share Price Movements

Par Value	Company	1961 High	Low	June 10	Latest
£1	A.E. Ind. Ord.	48/6	40/3	41/6	40/6
5/-	Albright & W. Ord.	29/6	26/3	26/9	26/9
£1	„ „ „ 5% Pref.	17/3	14/3	14/9	14/6
5/-	Anchor Chemical Ord.	25/6	16/-	23/9	23/9
4/-	Airfix	52/6	34/6	48/3	50/6
4/-	„ Non Voting	50/-	33/6	47/3	49/-
5/-	Andersons Rub. Ord.	—	—	3/9	3/9
£1	Angus Geo. Ord.	83/-	58/6	77/-	76/-
5/-	Ault & Wiborg Ord.	34/-	25/9	32/6	30/-
£1	Avon India Rubber Ord.	46/6	30/-	38/3	38/3
£1	„ „ „ 6% Pref.	19/3	18/-	18/9	18/-
10/-	Bakelite Ord.	66/3	42/3	58/9	57/6
£1	„ 6% Pref.	19/3	16/6	17/6	17/6
£1	Baker Perkins Ord.	59/6	40/6	56/9	56/3
4/-	Bank Bdg. Rubber Ord.	3/6	1/9	2/6	2/3
4/-	Bettix	11/9	7/6	10/9	10/6
4/-	Brammer H. Ord.	17/-	15/9	15/9	16/3
10/-	Bridge, David Ord.	60/-	46/9	51/-	49/-
5/-	Bright, John Ord.	18/9	13/9	17/3	17/6
5/-	Brit. Blting & Asb. Ord.	24/-	17/6	22/9	22/9
£1	„ „ „ „ Pref.	—	—	15/9	15/9
5/-	British Electronic Indus.	15/6	12/-	12/-	11/6
2/-	Brit. Ind. Plas. Ord.	14/-	7/9	14/-	13/9
2/-	„ 10% (tax free) Pref.	9/9	4/3	9/9	9/9
£1	British Xylonite Ord.	93/-	63/-	93/-	93/-
£1	„ „ 5% Pref.	18/9	14/-	15/-	15/-
£1	BICC Ord.	62/6	50/3	58/9	60/9
5/-	BTR Ind. Ord.	19/9	13/-	16/6	13/-
£1	„ „ 7½% Pref.	21/6	20/9	21/3	21/3
£1	Courtaulds Ord.	47/6	38/6	41/6	38/6
£1	„ 5% 1st Pref.	16/-	14/9	15/6	15/6
£1	„ 6% 2nd Pref.	18/3	16/9	17/9	17/9
4/-	Cow, P. B. Ord.	10/6	7/6	10/3	10/1½
£1	„ „ 5% Pref.	14/3	13/3	13/6	13/6
1/-	Dannimac Mfg. Ord.	15/3	12/-	14/9	14/3
10/-	De La Rue Ord.	70/-	56/-	63/6	59/9
£1	„ „ „ 3½% Pref.	10/6	9/6	10/-	9/6
10/-	Distillers Co. Ord.	42/3	30/-	37/6	34/3
£1	„ „ 6% Pref.	20/3	18/-	18/9	18/9
£100	„ 5% Conv. Loan	£96	£91	£92½	£92½
£100	„ 5½% Unsec. Loan	£86½	£79	£80½	£79½
10/-	Dunlop Rubber Ord.	29/-	21/6	26/3	25/6
£1	„ „ 5½% Pref.	16/-	15/-	16/-	15/9
£100	„ 3½% 1st Debs.	£69	£67	£69	£68
£100	„ 4½% 2nd Debs.	£79	£76	£79	£79
£1	Eng. Elect. Ord.	40/6	32/3	34/6	35/6
4/-	Ebonite Cont. Ord.	8/6	6/-	6/6	6/3
£1	English China Clays Ord.	117/6	80/-	110/3	106/6
£1	Goodyear Tyre 4% Pref.	11/6	10/9	11/3	11/3
5/-	Greeff Chem. Ord.	37/6	22/9	33/9	31/9

Par Value	Company	1961 High	Low	June 10	Latest
10/-	Greeff Chem. 5½% Pref.	8/3	7/3	7/6	7/6
4/-	Greengate & Irwell Ord.	6/9	5/-	6/6	6/9
5/-	Hackbridge Hldg.	6/9	4/9	5/6	5/6
£1	Harrisons & Crosfield Dd.	57/6	48/9	54/6	54/3
1/-	Hunt & Moscrop Ord.	2/3	1/3	1/9	1/9
£1	Imp. Chem. Ord.	81/6	63/-	74/9	71/9
£1	„ „ 5% Pref.	16/3	14/9	15/6	15/-
£100	„ 4½% Unsec. Loan	£83	£78	£81	£80
£100	„ 5½% Conv. Loan	£93	£87	£91	£88
1/-	Kleemann (O. & M.) Ord.	21/3	8/3	18/9	18/9
£1	„ 6½% Pref.	22/3	16/3	22/3	22/3
5/-	Laporte Ind. Ord.	30/9	24/-	28/-	28/9
£1	„ „ 7½% Pref.	23/-	21/3	21/3	21/3
£1	Leyland & Birm. Rubber Ord.	59/3	46/3	56/-	55/-
£1	„ „ „ 6% Pref.	18/9	16/9	17/6	17/6
2/-	London Rubber	15/6	9/6	15/-	15/6
£1	„ 6% Red. Cum. Pref.	20/-	16/9	17/6	16/9
£1	McKechnie Bros. Ord.	64/6	53/6	63/9	63/9
£1	„ „ 'A' Ord.	67/6	52/6	67/-	66/3
£1	„ „ 6% Cum. Pref.	18/-	16/-	17/-	16/6
5/-	Monsanto Chem. Ord.	27/6	21/9	22/-	21/9
£1	„ „ 3½% Pref.	12/6	11/6	12/-	12/-
£100	„ „ 6% Debs.	£98	£95½	£95½	£92½
5/-	Miles (H.G.) Hldgs. Ord.	7/9	7/-	7/6	7/6
2/-	Movitex	—	—	6/3	6/3
£1	North British Rubber	21/3	13/9	14/6	14/-
5/-	Northwestern Rubber	13/-	9/-	12/-	12/-
5/-	Plastic Enginrs. Ord.	40/-	28/6	39/3	40/-
10/-	Projectile & Eng. Ord.	50/6	22/6	45/3	42/6
5/-	Redfern Holdings Ord.	3/9	2/9	3/-	2/10½
2/-	RFD Ltd. Ord.	6/3	3/6	5/9	5/6
£1	„ „ 5½% Pref.	15/-	12/6	12/6	12/6
2/-	Rubber Imp. Ord.	6/3	3/3	3/9	3/6
2/-	„ „ 'A' Ord.	5/-	2/9	3/-	2/9
£1	„ „ 5% 1st Pref.	13/3	11/3	12/3	12/3
5/-	Rubber Reg. Ord.	18/3	16/9	18/-	18/-
4/-	Shaw Francis Ord.	24/6	17/3	19/6	17/6
2/-	Silentbloc Ord.	10/6	8/3	9/9	9/6
5/-	Storey Bros.	46/-	35/-	41/6	39/6
2/-	Sussex Rubber Ord.	2/7½	1/9	2/-	2/-
5/-	Sutcliffe Speak Ord.	18/6	13/6	18/6	18/3
£1	Tootals	35/6	28/-	33/6	31/6
£1	Turner & Newall Ord.	78/-	55/-	69/-	67/9
£1	„ „ „ 7% Pref.	21/6	20/6	21/3	20/6
5/-	Universal Asbestos Ord.	27/-	21/3	25/-	24/9
5/-	Viscose Dev. Ord.	16/3	13/3	15/9	15/9
5/-	Warne W. (Holdgs.) Ord.	21/6	14/9	21/3	21/3

Rubber Markets

LONDON

The market finished a very quiet week on a steadier note. Prices were latterly about ½d. per lb. above levels ruling a week ago. The upward tendency in London was almost entirely dictated by similar improvements at Singapore, but traders said little fresh business was uncovered at the advance.

Latest prices are as follows:

No. 1 RSS Spot: 25d.-25⅛d.

Settlement House:
July 25d.-25⅛d.
August 25⅛d.-25¼d.
September 25⅛d.-25¼d.
July/September 25⅛d.-25¼d.
October/December 25¼d.-25⅜d.
January/March (62) 25⅜d.-25½d.
April/June 25⅜d.-25½d.

No. 1 RSS cif basis ports:
June 24⅞d.-25d.
July 24⅞d.-25⅛d.

Godown:
June 84½ Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, August, 14s. 6d. cif European ports. Spot, seller, 15s. Bulk, seller, d.w. 14s. 6d. Normal, seller, August, 11s. 6d.

NEW YORK

The New York rubber market ruled as under on June 19:

DEALERS' PRICES

US cents per lb., ex-dock

	June 19	Previous
No. 1 RSS, June..	30a	30a
July ..	29½b–29⅝a	29⅝a
No. 2 RSS, June..	29⅞a	29⅞a
July ..	29⅞b–29¾a	29¾a
No. 3 RSS, June..	29¾a	29¾a
July ..	29½b–29⅝a	29½a
No. 1 RSS, Spot..	30⅛n	30⅛n
No. 3 amber blanket crepe, June ..	25⅛n	25⅛n

FUTURES — REX CONTRACT

	June 19	Prev. Close
July ..	30.00b–30.50a	29.75b–30.20a
Sept. ..	29.15b–29.35a	29.15b–29.30a
Nov. ..	29.10t	29.05b–29.20a
Jan. ..	28.85b–29.05a	28.80b–29.00a

Sales: Seven. Tendency: Steady.

Futures were steady in quiet, featureless trading on June 19. Physical rubber was quiet. Factories and jobbers were showing negligible interest. In late dealings, futures remained steady. Nearby July was moderately higher for the day, reflecting the maritime strike, traders said.

CEYLON

The price of No. 1 RSS at Colombo on June 19 was 101¾ (100½) Ceylon cents per lb.

BANGKOK

The price of No. 1 RSS at Bangkok on June 19 was 27.00 (26.75) US cents per lb.

SINGAPORE

The market ruled quietly steady during the morning of June 19, shortcovering maintaining levels which, although considered rather high in some circles, brought out very little selling. Lower sheet interest was small and few deals were reported. The morning session finished on a quiet note. Prices rose in the afternoon in quite active dealings. Lower sheets were neglected.

Malayan cents per lb., fob Malayan ports to open ports

	June 19	Prev. Close
No. 1 RSS, July ..	84¼–84½	83½–83⅝
August..	84½–84⅝	83⅝–83¾
No. 2 RSS, July ..	83⅞–84⅛	83⅛–83½
No. 3 RSS, July ..	83⅛–83⅜	82½–83
No. 4 RSS, July ..	80⅛–81⅛	79½–80½
No. 5 RSS, July ..	71⅛–72⅜	71 –72
No. 1 RSS, Spot ..	84¼–84½	83⅞–83⅞
No. 3 blanket, thick remilled crepe, July	71¼–72¼	70¾–71¾
No. 1 fine pale crepe, July	91¼–92¼	91 –92
2x thin brown crepe, July	67½–68¼	66½–67½

Tendency: Steady.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob, at 165.20d. per gallon.

AMSTERDAM

The Amsterdam rubber market ruled as under on June 19:

Guilders per kilo

No. 1 RMA	June 19	Previous
June	2.30	2.29
July	2.31	2.30
August	2.31	2.30
September	2.31	2.30
July September ..	2.31	2.30
October	2.32	2.31

Sales: Nil. Tone: Quiet.

DJAKARTA

Values were a shade steadier. Offerings were noted for crepe, but buyers were reserved. The market closed steady.

Rupiahs per kilo

	June 21	Previous
Spot No. 1 Priok ..	32.00b	31.25b
Spot No. 2 Priok ..	31.00b	30.25b
Spot No. 3 Priok ..	30.00b	29.25b
No. 1 fine pale crepe, spot	29.50b	28.00b

Tendency: Strong.

Cross-channel Link

Two fifteen-mile lengths of submarine power cable, the British half of the link that is to connect the British and French electricity systems, have been laid side by side from Dungeness in Kent to a point in mid-Channel. The task of making and laying the cable has been carried out by Associated Electrical Industries Ltd. and British Insulated Callender's Cables Ltd.

STOCK MARKET

Continued from page 1026

dend at the rate of 8½% which with the interim already paid will bring the year's total to 13½% against 12½% last time. The directors estimate that profits will be £33.8m. compared with £32.1m.

Turnover of DE LA RUE has increased by £1½m. to £18½m. However, profits of £2,130,400 are slightly lower than in the previous year. The dividend is 22½% on capital as increased by a one-for-four share bonus compared with the previous equivalent of 18%.

Laporte Reaps Benefit

'We have reached a period', states P. D. O'Brien, chairman of Laporte Industries Ltd., in his annual report, 'in which we are reaping the benefit of past capital expenditure, but also in which new plants are being erected which are not yet contributing to group earnings'. During the year total net assets rose from £18.9m. to £26.5m.

The £3m. expansion programme for Laporte Titanium Ltd. (titanium oxide), at Stallingborough, Lincolnshire, is reported up to schedule.

The main emphasis in the report is on plans for the future expansion of the group.

Preliminary work on the new £A4m. titanium oxide plant at Bunbury, Western Australia, has already begun.

In America, negotiations have been completed, and a full understanding reached, with American Potash and Chemical Corporation about the first West Coast titanium oxide plant in USA.

British Industrial Plastics has formed a new subsidiary, BIP Gaydon Ltd., which will launch this range of Gaydon Melmex melamine tableware in September. Each process, from the original design to the marketing of the finished product, is completed within the BIP group. The Melmex moulding powder is manufactured by BIP Chemicals Ltd. and moulded by The Streetly Manufacturing Co.

Another Ekco Design Success

THE Ekco Plastics industrial design team have won another Council of Industrial Design Award with their Paragon chemical closet, chosen as

one of 'the 13 most outstanding designs of 1961'. Marketed by Racasan Ltd., of Ellesmere Port, Cheshire, the 'Paragon' was designed in the Ekco Plastics Industrial Design Studio by Martyn Rowlands, the consultant.

The closet consists of a single container in high density polythene with a stainless steel carrying handle, and detachable lid and seat in medium density polythene. The hinges are nylon and the grip on the handle is a pvc extrusion.

In reviewing the design, the judges praised the selection of the best plastics materials for each part, as well as the functional details.

Across the Pennines

The headquarters of the Dunlopillo Division of the Dunlop Rubber Co. Ltd. are now at Pannal, Harrogate, where extensions have been completed. The other Dunlopillo factory is at Hirwaun, South Wales.

This is the final stage in the operation of transferring Dunlopillo Division from Rochdale.

British Standards

BS 3284:1961

This new British Standard has been prepared to meet the needs of industry, but in view of the limited background of general practical experience, says the foreword, it must in certain respects be regarded as subject to revision in the light of further developments.

The new standard is complimentary to BS 1972, published in 1953, on low density polythene for cold water services. BS 3284 covers a newer type of polythene, which although basically similar to the material covered by BS 1972 has different mechanical characteristics.

The composition of the extrusion compound laid down in the specification consists of a mixture of polythene with a density greater than 0.93 carbon black and *either* NN′-di-2-naphthyl-*p*-phenylenediamine *or* N-stearoyl-*p*-amino-phenol. The carbon black content shall be 2.5 ± 0.5% when tested by method 405A of BS 2782, and the antioxidant content should be not more than 0.3%. The extruded pipe shall contain 2.5 ± 0.5% of carbon black and not less than 0.02% of antioxidant.

The specification covers three grades of pipe known as Class B, C and D, recommended for working pressures not exceeding 200ft. head (86.7lb./sq. in), 300ft. and 400ft. respectively. Also included in the standard are internal and external pipe dimensions, photomicrographs showing satisfactory and unsatisfactory dispersions of carbon black, stress rupture tests, tensile tests, reversion tests and marking and packing requirements. Appendices give methods of test and notes on the use of these pipes, including details of jointing, bending and fixing.

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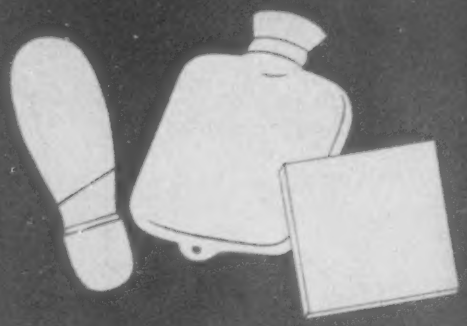

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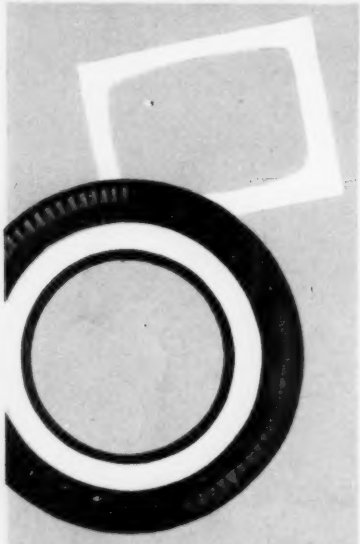

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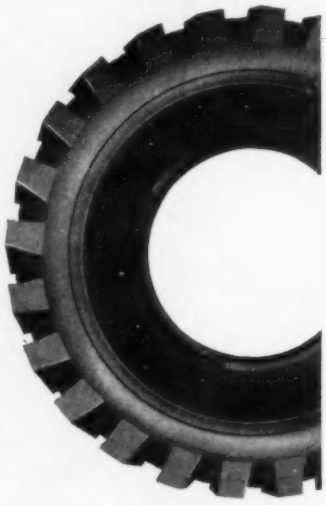

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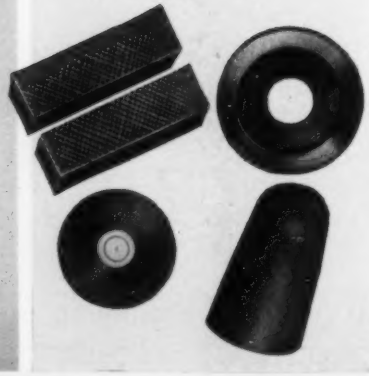
A low-priced, non-staining, non-discolouring antioxidant, suitable for use in all white and light-coloured applications. Readily forming a stable emulsion, it is particularly suitable for use in latex, and in latex foam it is most effective in minimising compression set.



BLE 25

BLE/25 is a superlative antioxidant for tyres, high speed mechanicals, compounds heavily loaded with carbon black or other fillers, as it is a flux of the best type. Its heat-ageing qualities and flex-cracking have no equal among antioxidants.

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